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MODERN METHODS IN UROLOGICAL SURGERY.[1]

By HENRY MORTENSEN, M.B., B.S. (Melbourne), F.R.C.S. (Edinburgh),
Melbourne.

THE study of genito-urinary conditions has increased to such an extent in the last few years, even to its becoming in itself a specialty within the greater specialty of surgery, that to attempt to deal with all the debatable points or even to touch on all the recent improvements in diagnostic measures and operative technique is an impossibility. However, I shall endeavour to discuss a few of the points of interest to general practitioners and surgeons.

THE PROSTATE.

The prostate is an organ that should command the interest of all practitioners. We can palpate the main portion of it, we can see with the cystoscope the mucous membrane of the bladder and the posterior part of the urethra over it and consequently the results of its enlargement; still we know in detail only its anatomy. Its physiology is not fully clear, the various pathological processes leading to its enlargement have always been and still are the subject of continual argument. The best method for the removal of the gland is debatable and, subsequent to its removal, the method of dealing with the prostatic cavity and the after-treatment of prostatectomy are matters on which every urological surgeon holds and exercises his own views. The results of treatment of malignant disease of the organ are as hopeless, if not more hopeless, than those of malignant disease anywhere else in the body. This is due in a great degree to the rapidity of spread to more inaccessible parts and to the fact that patients will remain symptomless for a great length of time; but more importance must also be laid on the failure of the investigator to realize the necessity of making a rectal examination in every complete overhaul of a patient.

Some considerable time ago a patient consulted me with a history of pains in the back and down both thighs

[1] Read at a meeting of the Victorian Branch of the British Medical Association on May 2, 1931.

which had been treated for nine months with a diagnosis of neuritis. On examination he disclosed a typical infiltrating hard mass of a prostatic carcinoma and died some little time later.

It must also be realized, and many observers have stressed this of late years, that a large proportion of prostates removed with the clinical diagnosis of benign hypertrophy show on section foci of precancerous or cancerous tissue. Many of these prostatic enlargements disclose their true pathological nature only on serial section, and I draw attention at this stage to the importance of having every removed prostate sectioned in this manner. Wade, of Edinburgh, states that the incidence of this unsuspected carcinoma is 14%; Jocelyn Swan and Thomson Walker, 16%. These statements must receive serious consideration when discussing with a patient the question of operation in a case of prostatic hypertrophy. Bugbee has discussed a number of such patients and has shown that all of them gave a history of acute retention after a short illness or after a long period free from exacerbations. Prostatic malignant disease shows a marked tendency to metastasize to bone. Many cases of clinically benign tumours, pathologically discovered to be malignant, have disseminated in this fashion before their removal. It is suggested, therefore, that as a precautionary measure an X ray examination of the pelvis and lower part of the spine should be made whenever prostatectomy is contemplated. As an instance of the value of such an examination a case is quoted of a man, aged sixty-seven years, who complained of urinary symptoms and gave the history that six years previously his prostate had been removed. On rectal examination a mass was found corresponding to the left lobe of his prostate; this mass was free at its rectal border, but inclined to be fixed at its base. A radiological examination was made and a small secondary deposit, the size of a threepenny piece, was seen in the pubic bone. May I, in passing, quote this case as an instance in favour of early removal of the prostate, as this patient would undoubtedly have been dead some three years before if the operation had not been performed? An X ray picture will have the added advantage of disclosing the occasional presence of prostatic calculi with the suggestion of previous inflammation and the possibility of difficult removal.

From the point of view of the diagnosis of prostatic disease, attention is drawn to the fact that far too often the practitioner is content to label a patient with frequency of micturition as suffering from chronic cystitis. True chronic cystitis is probably a very rare disease *per se;* acute cystitis, properly treated, rapidly subsides and therefore any prolongation of the symptoms should rouse suspicion of an underlying causative factor. In the young one should always think of tuberculosis, in the female of gynæcological conditions, cervical infections, cystocele *et cetera*, and in the male patient of prostatic age one should think of residual urine arising from a prostatic hypertrophy. Chronic prostatitis must always be borne in mind as an ætiological factor in many conditions. Apart from well known conditions, such as joint troubles and eye diseases, in which the possibility of a prostatic origin is always discussed, there are a great number of more obscure conditions in which a sealed focus in the prostate may provide an explanation. It has been demonstrated that in patients with no history of previous urethritis an infected prostate may show the same strain of organisms as that seen in periapical abscesses, tonsils, sinuses *et cetera*.

Apart from diagnosis the general practitioner who does not operate, should be interested in the question of when to advise operation in cases of benign enlargement. This may be an extremely difficult matter to decide. We know that prostatic hypertrophy is a progressive disease which is not influenced for any length of time by any local non-operative treatment. Prostatic massage has been recommended in the early stages. We know that the longer the condition remains, the greater the disturbance of the bladder emptying, the greater the possibility of infection, the greater the certainty of back pressure. We also know, as mentioned previously, of the high percentage of malignant disease in prostates previously thought to be benign. And yet, on the other hand, prostatectomy carries with it a high mortality rate, ranging in a general surgical practice from 10% upwards. The general condition of the patient, tests of renal function, the amount of residual urine, the presence of infection in residual urine, will lead to the correct conclusion.

Tests of Renal Function.

Of the various tests that are employed for estimating the function of the kidney, the following are in most general use:

1. Blood urea estimation. This is a test that cannot very readily be carried out by the practitioner or surgeon himself. When giving a high reading it is a definite indication of severe damage to renal function.

2. Urea concentration test. This test is easily performed with a simple apparatus, and gives results which may be interpreted as in the blood urea test. Attention is drawn to the fact that in most cases both of these tests reveal only severe degrees of kidney damage, and that it has often been demonstrated that even severely damaged kidneys may show very little departure from the normal response to these tests. A disadvantage of the second test lies also in the fact that it requires for its accurate performance a limiting of the quantity of the fluid intake for some time previously; such a limitation is most undesirable in many of these cases.

3. The Strauss or water test. This test is readily performed and is of the highest value. Wildboltz, of Berne, considers it the most sensitive of all the tests and the first to give indication of failing renal function. The details are as follows:

Should there be any residual urine or difficulty in micturition, a retention catheter must be used.

Between 7.30 and 8 a.m. 1,500 cubic centimetres of a bland fluid are given the patient. The bladder is emptied at 8 a.m. and subsequently at four intervals of half an hour, at two intervals of an hour and at four intervals of two hours. At each emptying the specific gravity and the quantity of urine are plotted on a graph. Normally 60% to 80% of the intake is excreted in the first four hours and the greatest partial function occurs in the first two or three periods. The lowest borderline of normality in the specific gravity variation is taken as 15. A normal chart would therefore give the figures shown in the accompanying table.

Table showing normal readings in Strauss or Water Test.

Time.	Quantity discarded, in cubic centimetres.	Specific Gravity.
8.30 a.m. ...	90	1·010
9 a.m.	450	1·001
9.30 a.m. ...	250	1·001
10 a.m.	200	1·005
11.30 a.m. ..	130	1·010
12 noon[1] ...	150	1·012
2 p.m.	80	1·016
4 p.m.	60	1·020
6 p.m.	70	1·024
8 p.m.	80	1·024

[1] Dry dinner is then given.

The great objection to the commonly employed tests is that they do not in any way supply us with information on a point of paramount importance in arriving at a prognosis, namely, what will be the reaction of the kidney to operative shock or to infection? Attempts have been made to secure this information by an examination of the blood cholesterol, but the results are so far too indefinite to be of any value.

Surgical Technique.

Discussing the question of surgical technique, we are confronted with a bewildering array of operative procedures, suprapubic or perineal, one stage or two stage, with the use of packing or without it, closed or open, and so on. But there arises out of an investigation that I had the opportunity of carrying out recently at Saint Paul's Hospital, London, into the results of prostatectomy in 280 cases, performed by various surgeons by various methods, that the mortality rate and the end results were practically uniform. Young, with the perineal method, achieves a very low mortality rate, but to those inexperienced in this method the anatomical dissection is difficult and fraught with dangers of subsequent incontinence. Thomson Walker, with his "open operation," now has a mortality rate of about 2%; but, as a warning to those who may feel that the performance of this operation according to his technique will lead to similarly satisfactory results, it is pointed out that the mortality rate has decreased from about 20% when the technique was first adopted. Since then this great surgeon has performed over 2,500 prostatectomies and his average time for the performance of the operation has been reduced to seventeen minutes. The average mortality rate for 12,000 prostatectomies performed in a series of general hospitals in England ranged around 16%. There is no doubt that this percentage can be reduced (i) by care in preoperative treatment and in the selection of cases, (ii) by a standardization of technique, and (iii) by still more rigid postoperative care. In no branch of surgery is this last point more important. A well known urologist in London states that the advent of a new resident medical officer unversed in urological methods is marked by a sharp increase in morbidity and mortality.

A method of dealing with some cases of prostatic disease worthy of consideration is that known as Luys's operation or "*forage*" of the prostate. It consists in a tunnelling *per urethram* of a channel through the prostate, and the operation is performed at the present time with a diathermy electrode or a diathermy punch. This method is particularly indicated when the patient is obviously too ill to undergo the trial of a complete prostatectomy, when sclerosis or fibrosis of the prostate is present, or in the presence of prostatic or median bars. The mortality rate is extremely low, the upset much less than with a prostatectomy, and the results temporarily quite satisfactory.

Great as is the diversity of opinion as to the best method of dealing with a benign prostate, even greater differences of opinion exist concerning the malignant prostate. The methods used are as follow:

1. The operative method, which may consist in either (*a*) simple prostatectomy, which is accepted now as being contraindicated where the diagnosis is definitely established before operation, or (*b*) Young's resection of the prostate, bladder base and vesicles. Young's resection gives more encouraging results, but gives a high operative mortality in comparison with the results.

2. By the use of radium: (*a*) inserted through the perineum, either by the blind plunging of needles into the prostate, a method open to obvious objections, or by a perineal dissection of the prostate and irradiation by means of carefully placed and screened needles. I have seen a number of patients who have been treated in this fashion, and, providing they are seen early enough and are sufficiently irradiated, good results are to be expected. (*b*) An attempt has been made to perform this irradiation through the bladder.

3. Deep X ray therapy provides a method which has a definite effect on the malignant mass in many cases and has also a definite effect in the relief of pain. It should be used as a routine measure following any operation on a malignant prostate or on a prostate found at operation to be malignant, and is worthy of trial in an inoperable case.

Radiological Examination.

May I now apologize for trespassing on the ground of the radiologist in regard to the next points that I wish to discuss? But in genito-urinary work the question of accurate diagnosis is so bound up in the interpretation of X rays that a knowledge of radiology is essential to the practitioner. It is

important to realize that a number of conditions apart from renal calculi may throw a confusing shadow in the renal area: (i) Conditions outside of the body, such as defects in the film, intensifying screen, or bubbles from faulty development, have given rise to error, as also have small tumours of the skin. (ii) Conditions in the body, other calculi, such as gall stones, pancreatic calculi or concretions in the colon, may be confusing. Gall stones are diagnosed from their shape, their structure, and their multiplicity. In a doubtful case useful information may be obtained from comparing the film taken in a dorso-ventral position with that taken in a ventro-dorsal position. Pancreatic calculi tend to be close to the mid-line, whilst concretions in the colon vary from time to time in their position, move freely under the fluoroscope and have their shadow intensified by the injection of gas into the colon. Calcified glands are also a source of great error and difficulty; their configuration is as a rule typical and they are generally multiple. Finally, rarer conditions, as an exostosis of the rib, are occasionally encountered.

S. Gilbert Scott has pointed out that a vast amount of knowledge as to the position of a shadow on the plain film may be gained by the assumption that any opacity located within the limits of the kidney shadow must be of renal origin, if the respiratory excursion of the shadow is equal to that of the kidney in direction and extent. This method has the advantage of being very simple, requiring the taking of only two films, one during inspiration and one during expiration, and in the great majority of doubtful shadows it is possible to establish a diagnosis. It has, however, one or two fallacies. Glands adherent to the kidney or a calcified paranephric abscess will move with the kidney, whilst it is conceivable that a calculus lying loose in a hydronephrotic pelvis will not give an excursion coinciding with that of the renal outline. Again, one must always remember the possibility of the presence of multiple pathological conditions. I have seen a calcified cold abscess, a gland and a calculus on the same film.

Intravenous or Descending Pyelography.

Intravenous or descending pyelography, the latest method of diagnosis, marks, I am sure, one of the greatest advances made in the history of urological surgery. The principle is well known. For many years past many investigators have attempted to find substances that, ingested or injected into the body, would give radio-opaque urine; but until Lichtenberg and Scwick, of Berlin, in 1929 produced "Uroselectan," no drug was found that would do this and which was sufficiently non-toxic to be of value. The drugs used depend on their iodine content for their radio-opacity; the iodine content is 42% in "Uroselectan" and 52% in "Abrodil." It is found that in normal cases the drug is rapidly excreted. With "Uroselectan" after one hour 90% is excreted, half of which is in the urine; after four hours 96% is excreted; 2% to 3% is excreted in the stool, whilst 1% is unaccounted for. The drug is used in a dose of from 15 to 20 grammes dissolved in from 50 to 100 cubic centimetres of trebly distilled water and given intravenously. When it is particularly desired to obtain a good outline of the great cavities, Palugway, of Vienna, suggests that no fluid should be given for twelve hours prior to the injection; whilst if a view of the parenchyma is desired, it is necessary that the amount of fluid should be increased and the patient should be made to hold his urine. Opportunity has been obtained of verifying this. Very few ill results have been seen after the use of "Uroselectan." Care must be taken with patients in whom any difficulty may be anticipated in the excretion of the iodine in the drug, as, for example, with goîtrous patients, or when a severe degree of renal damage must be expected. The indications for intravenous pyelography from the radiographic point of view present themselves as those cases in which the ascending method is either (i) difficult or impossible, or (ii) when it is contraindicated. These two groups of cases may be considered separately. The use of the ascending method is difficult or impossible in the following circumstances: when urethral stricture prohibits the passage of the cystoscope; when ureteral stricture is present; in the presence of prostatic hypertrophy; in children; in cases of thimble bladder; when there has been a transplantation of the ureters performed in patients with marked hæmaturia rendering the passage of the ureteric catheter impossible.

The use of the ascending method is contraindicated in acute renal infections and in suspected tuberculosis. In solitary kidney, whilst ascending pyelography may not be absolutely contraindicated, yet it is fraught with risk.

Often congenital abnormality of the kidneys, such as double kidney and the various degrees of bifid and double ureters, is not revealed by the ascending pyelography, only one ureter or one arm of a bifid ureter being disclosed; but these abnormalities are all disclosed with excretion urography.

The writer has used the preparation "Abrodil" in a number of cases and is under the impression that the shadows are denser and the drug excreted more rapidly than with "Uroselectan." Descending pyelography has the great advantage over the older method of being a physiological method. The injection of the opaque medium into the ureter produces in some cases a temporary spasm and thus leads the observer to a wrong conclusion; but the excretion of the non-irritating drug *viâ* the normal route produces a perfectly normal reproduction of the renal tract. Fallacies, of course, also occur with "Uroselectan." It is possible for a calyx to be destroyed or partially destroyed with the corresponding amount of renal tissue, and the excretion of the drug gives the appearance of normal calyces, perhaps with the appearance of only two calyces, when the ascending pyelography may demonstrate the third. Apart from their radiological value, these drugs may have two other uses; they may serve

either as a test of renal function or as a therapeutic measure.

Excretion urography depends on the function of the kidney tissue. It is tempting, therefore, to use this method as a diagnostic aid in determining renal function, and providing there is no obstruction to the outflow of urine, it may give results that are approximately correct. But should there be any kink or obstruction to the outflow of urine, a poorly functioning kidney may in time give a very dense shadow. This principle is used by some in the taking of pictures, a compression band being placed around the abdomen. Anomalies of excretion do occur. The writer quotes a case in his experience of pyonephrosis on the right side with no excretion of indigo-carmine, but showing, by this method, a perfectly functioning left kidney. On injecting "Uroselectan" no shadow occurred on either side, though the patient was watched over a long period.

Several observers have drawn attention to the fact that renal infections that have been submitted to this method of investigation, have shown definite improvement, and this is hardly to be wondered at when one considers the iodine content of the drug.

To sum up, by this method it is possible (i) to obtain simultaneously by means of a physiological method both anatomical and functional information on the renal tract, (ii) to obtain this information on both sides of the renal tract, (iii) to secure this information without pain or disturbance to the patient, and (iv) possibly to produce improvement in the patient's condition.

Rejuvenation.

The question of rejuvenation is always interesting. The Voronoff operation and that of Steinach have been up till now the classical operations. These procedures seem, temporarily at any rate, to produce improvement in the patient's general condition, if not in his sexual powers. There is a lowering of the blood pressure, a reduction of tremor, if tremor is present, an increase in general vitality, and particularly an improvement in memory. The operation of Döppler, of Vienna, is being used extensively abroad. It depends in principle on the fact that friction of a vessel with a 6% to 7% solution of isophenol will destroy the sympathetic filaments. Döppler therefore exposes the cord through an inguinal incision and rubs vigorously the vascular structures in it. On some occasions he also exposes the external artery and treats it similarly. He also injects into the cord a 5% solution of isophenol. The operation has the same effect as a periarterial sympathectomy and induces an artificial hyperæmia with pronounced and prolonged results.

Culture of the Tubercle Bacillus from the Urine.

Wildboltz, of Berne, has recently reported on one thousand cases of renal tuberculosis. Bilateral disease was found in 12% of these cases, and 660 nephrectomies were performed. Of the patients 341 were seen from ten to twenty-five years after operation and 60% were declared to be cured. These results demonstrate that this form of tuberculosis is not so lethal as one sometimes thinks. But Wildboltz stresses the need for early diagnosis and the relative hopelessness of bilateral disease. The method of isolation of the bacillus in a direct smear of the urine is unsatisfactory, and the duration of time necessary for the demonstration of tuberculous infection in the guinea-pig may waste a most valuable eight weeks. Numerous workers recently have cultivated the *Bacillus tuberculosis* with accuracy; it is very sensitive in cultures and requires a much longer time for development than do other groups. It is also extremely sensitive to contamination. A special egg medium is used and the contaminating organisms arising in an ordinary specimen are killed by contact with a 15% solution of sulphuric acid; this procedure appears also to destroy the smegma bacillus. The colonies appear in from eight to twenty days.

Summary.

An endeavour has been made to point out:

1. The necessity of routine rectal examination.
2. The possible advantages of routine preoperative X ray pictures in suspected cases of prostatic disease.
3. The frequency of malignant disease of the prostate in cases previously thought to be benign.
4. The danger of labelling all cases when marked frequency of micturition occurs, as "chronic cystitis."
5. The importance of chronic prostatitis, specific and non-specific, as an ætiological factor in disease.
6. The difficulty in determining the correct time for operation in benign hypertrophy of the prostate.
7. The details and ease of performance of the so-called "water" test in estimating renal function.
8. The various methods of performing prostatectomy.
9. The various possible methods of dealing with prostatic malignant disease.
10. The differential diagnosis of a shadow appearing in the renal area in a plain film.
11. The advantages of and indications for excretion pyelography.
12. The details of Döppler's operation for rejuvenation.
13. The possibility of obtaining a culture of the tubercle bacillus direct from the urine.

CANCER OF THE RECTUM.[1]

By L. M. McKillop, M.B., Ch.M. (Sydney), F.R.C.S., F.R.A.C.S., *Honorary Surgeon to In-Patients, Mater Misericordiæ Hospital, Brisbane.*

I PROPOSE briefly to review the present position of the treatment of cancer of the rectum and to give

[1] Read at the Second Cancer Conference, Canberra, March 1931.

the result of treatment, as far as my personal experience is concerned, under the following three headings: (i) Carcinoma of the pelvi-rectal junction, (ii) carcinoma of the supra-ampulla and of the ampulla of the rectum, (iii) carcinoma of the anal canal and anus.

Before doing so, let me quote the mortality figures for the disease, covered by the ten-year period 1920–1929. During this period no less than 2,197 persons (1,284 males and 913 females) died of cancer of the rectum and anus in the Commonwealth of Australia. In Queensland during the same period 274 persons (154 males and 120 females) died from the disease. I think it will be admitted that this form of malignant disease is of extreme importance, particularly from the point of view of early diagnosis and prompt and drastic treatment, as by this means alone will the patient be saved in this, as in any other form, of cancer. In this connexion I should like to refer in passing to the work of J. P. Lockhart-Mummery, of London, who in season and out of season has been teaching us that the disease almost always arises in the degeneration of one or more adenomata of the rectal mucosa. Further support to this idea is lent by the fact that it is now known that cancer may arise simultaneously in the rectal wall, at one or more spots,[1] as indeed it may be coincident with, or followed by, the subsequent development of another primary cancer elsewhere in the body.[2] I have knowledge of several instances of this happening. Cancer of the rectum accounts for one-third at least of all growths of the alimentary tract. My personal experience in dealing with rectal cancer extends over a period of about nineteen years and covers thirty-five cases. Of these one-half have been seen during the past eleven years, and one-third of them in the last four years.

Cancer of the Pelvi-Rectal Junction.

Cancer of the pelvi-rectal junction is of great importance for three reasons: (i) It is apparently becoming more frequent; (ii) it represents more than one-half of all cases of rectal cancer; (iii) if diagnosed early, it is especially amenable to surgical treatment with a good prospect of a permanent cure.

The disease most often takes the form of a scirrhous type, gradually infiltrating the gut wall and progressively narrowing the lumen. Coincident with this are symptoms of a fairly characteristic type such as occasional cramping gas pains across the lower part of the abdomen, slowly increasing difficulty in getting the bowels open and flatulent distension of the abdomen. Cachexia and loss of weight are usually late symptoms.

The cases in this group numbered seventeen. The first patient was seen in 1912. A left inguinal colostomy only was done and the patient lived in comparative comfort for nearly two years. Of the remaining sixteen patients in this group, six are still alive and well, two of them over ten years after operation, two of them over two years, and two have been operated upon only in the last few months. Of the full total of seventeen patients with pelvi-rectal cancer, four died within forty-eight hours of operation, one after the preliminary colostomy and three after the resection.

Methods of Treatment Employed in This Group.

Treatment by Colostomy Alone.—Treatment by colostomy alone was employed in seven cases as visceral examination through a preliminary rectus sheath wound showed that the growth had spread extensively to the bladder or uterus, or had become so densely fixed as to be irremovable, or the liver or mesenteric glands had become extensively involved. All of these patients are, so far as I know, with two exceptions, dead, and these two I now regard as suffering from diverticulitis. In passing, let me briefly refer to the difficulty one sometimes meets with in differentiating between a purely localized pelvic colon diverticulitis, with its associated matting together of the contiguous viscera, and a pelvi-rectal cancer. In some cases it is practically impossible to be sure which is the true lesion. Guidance may be obtained in four ways: (*a*) By a careful review of the history, particularly in regard to the duration of symptoms; (*b*) the absence, in what might look like an advanced case of cancer, of any nodule in the liver; (*c*) the result of biopsy of a gland from the pelvic meso-colon; (*d*) the result of a white cell count—a well marked leucocytosis favouring the inflammatory trouble.

Little reliance can be placed upon the general appearance and weight of the patient, both of which may, in cancer, remain satisfactory until the disease is far advanced.

Before going on to a brief description of the radical operation I perform for pelvi-rectal and ampullary cancers, I should like to express the opinion that a preliminary colostomy is practically an essential in the treatment of rectal cancer, for the following reasons. It controls the diarrhœa and bleeding to an extent, abolishes a considerable degree of the pain and irritation caused by the passage of stool over the new growth, lessens the toxicity of the latter and prolongs the life and comfort of the patient. It should be done early, even if nothing more can be done. No doubt it has some considerable disadvantages, but its unpopularity has been, and still is, largely due to badly planned and ill-performed types of operation. A further advantage of the operation is that it allows of a thorough exploration of the growth, the mesentery and the liver, and if a radical operation is decided upon, the colostomy may be done as part of the first stage.

In the earlier cases in this group the abdomen was opened through the left rectus sheath and the exact position, extent and fixity or otherwise of the growth were ascertained, as well as the extent of involvement, if any, of the mesentery and liver. In two very early cases the peritoneum on each side of the gut in the pelvic floor was incised, the bowel mobilized and pulled up and an excision and end-to-end anastomosis done, in one case over a rubber tube and in the other by straight out circular stitching. One of these patients lived two years and the other, operated on about nine years ago, is still well. In the other earlier cases a palliative colostomy only was done and all of these patients

with the two exceptions alluded to (almost certainly suffering from diverticulitis) are dead.

Radical Excision.—Later on, following the teaching of W. Ernest Miles, of London, a very radical operation is now done, usually in one stage as follows:

The abdomen is opened and the location of the growth, and the condition of the meso-colon and liver are determined. Considerable involvement of the former and any degree of involvement of the latter are absolute bars to anything beyond a palliative colostomy. Should it be decided to proceed, the pelvic meso-colon is pulled up and the inferior mesenteric artery is identified, doubly ligated and cut across, just below the origin of the upper sigmoid artery. The pelvic colon is then "milked" of its contents and a stab wound is made just above and internal to the left anterior superior iliac spine. Through this a long jawed clamp is introduced and made to grasp the bowel rather obliquely, just midway between the points where the upper and middle sigmoid arteries reach the gut wall. A purse string of thread is now placed around the bowel 3·75 centimetres (one and half inches) below this point and a clamp is placed on the bowel just below this suture. The bowel is then divided below the top clamp with a cautery or strong scissors and the two ends are wiped clean and sterilized by iodine and rectified spirit. The top clamp is now withdrawn through the stab wound, carrying with it the proximal stump of gut, and is left in position during the rest of the operation (and for two days subsequently). The bottom clamp is now gently removed, the end of the open gut invaginated and the purse string suture tied. The stump is again disinfected and wrapped in a small sterile swab which is tied into position. The two leaves of the meso-colon are now undermined with scissors and cut down along the sides of the colon until the incisions meet across the gut at the peritoneal reflexion on the pelvic floor. With the forefinger the meso-rectum is now freed from the hollow of the sacrum and well out to the sides. The middle sacral vessels will require tying. The dissection is then carried up behind the pelvic meso-colon, to the point of ligation of the inferior mesenteric artery and even higher. The whole of the liberated connective tissue of the pelvic colon, meso-rectum, contained glands, and the distal loop of gut are all pushed well down and the attachment of the latter to the bladder and prostate (or vagina) in front freed. A small gauze sponge is now pushed down on top of all and the peritoneum of the pelvic floor is very accurately and carefully sutured, after seeing that the left ureter has escaped injury. The main abdominal wound is now closed in layers and sealed with collodion. If the patient's condition will allow of it, the second stage is now commenced by turning the patient on the left side, with knees well drawn up. The anus is surrounded by a silk thread, which is very tightly tied, and iodine is applied. It is then surrounded by two elliptical incisions, which begin on the lower end of the sacrum and meet again in the mid-line of the perineum. This incision is deepened, the coccyx is removed (also the last two segments of the sacrum, if necessary), the ischio-rectal fossæ opened, and the *levatores ani* divided as far out as possible. The anus, rectum and severed pelvic colon are freed and removed, a gum elastic catheter being used in the urethra as a guide to avoid damage to the urethra and bladder. Bleeding points are controlled and the wound packed with gauze around a drainage tube. The surplus of the large wound is then sutured. Some operators employ spinal anæsthesia for the perineal stage of the operation, but I have no personal experience of this step.

The abdomino-perineal operation just described is a very severe one on the patient (and also on the operator) and, especially if done in one stage, the death rate is usually high. However, with careful selection of cases, good preoperative preparation and carefully given anæsthesia, I have been fortunate enough to have four out of the last six patients survive the ordeal. Apart from post-operative shock (which is best treated by measures taken to anticipate it) the greatest dangers in the operation come from sepsis, particularly from errors in securing the inferior mesenteric artery at the wrong level, or from insufficient sterilization of the distal segment of the severed colon. The operation is for a desperate condition, and, like all operations for cancer, must be thorough.

Treatment by Radium.—So far as pelvi-rectal cancer is concerned, I have as yet had no experience of its treatment by radium, as I regard the condition as essentially a surgical one, Miles's operation being required if the condition is early, left inguinal colostomy only if the condition is advanced. However, now that radium emanation is available for Brisbane, I will try the effect of burying the seeds in the pelvic mesentery, when doing colostomy in the next advanced case. Ineffective screenage of radium is the bugbear in its use in the internal viscera, apart from the question of access and radio-sensitivity, and Sir Charles Gordon-Watson deals with this aspect in his recent article in *The British Medical Journal.*[3]

Cancer of the Body of the Rectum.

In cancer of the body of the rectum two main types are met with—the exuberant cauliflower type and the infiltrating scirrhous or ring type. Indefinite discomfort on defæcation is the early sign, to be followed soon by diarrhœal attacks and blood-stained mucus motions.

Fourteen patients with cancer of the body of the rectum have been treated by me; of these, nine have been treated in the last five years, and three of them are alive and well over two years, three treated within the last twelve months are *in statu quo*. Of the remaining eight patients, all are, as far as I can find out, dead. Of the fourteen cases of ampullary and supra-ampullary cancer, eight were in males and six in females. Cancer of the rectum is not, contrary to a common idea, a disease of advanced life only. The incidence of the disease is greatest in the age-period fifty to sixty, but Sir Holbert Waring mentions having seen the disease in a girl of sixteen years. My youngest patient was a man of twenty-nine years. Carcinoma arising in the body of the rectum is a very serious condition, as mixed infection occurs early and has probably more to do with the rapid decline of the patient than has the neoplasm itself. Spread of the cancer cells to the longitudinal muscular coat soon takes place and leads to rapid involvement of the meso-colic glands and the liver.

Treatment.

For a fairly early case where the growth involves the upper or middle part of the organ, I consider Miles's operation the most suitable. For cancer of the lower (ampullary) section perineal excision, as practised by Lockhart-Mummery, is very suitable. Kraske's operation of splitting the sacrum is now seldom done.

Treatment of Ampullary Cancer by Radium.—My personal experience of treatment of ampullary cancer by radium covers only four cases, and I can definitely state that great temporary relief followed in each instance. Three of these four patients are still alive, two of them over one year after treatment, and are leading comfortable lives, with the aid of colostomy. It is no easy matter to apply radium to the best possible advantage in a case of cancer of

the body of the rectum. I have employed the approach recommended by Neuman and Coryn as detailed in Cade's "Radium Treatment of Cancer." It is quite useless, and indeed dangerous, to plant radium needles about a cancer in the rectum unless two precautions are taken: (*a*) That the approach is sufficient to ensure that the whole growth is uniformly irradiated and that no needles perforate the mucous membrane; (*b*) that sufficient screenage is employed, at least 0·8 millimetre of platinum being necessary to exclude the β radiation. I have not yet used any radon in the treatment of rectal cancer. Gordon-Watson is not very enthusiastic regarding the use of emanations.

Cancer of the Anus.

My experience of cancer of the anus covers four cases. Two of the patients were seen early and two in an advanced condition. Three were females. Of the two with advanced growths, one is dead and the other is due to die very soon. Of the two with early growths, one had a radical operation six years ago and remains well, the other, who flatly refused a preliminary colostomy, was treated by interstitial radium application a year ago, and appears to have made a good recovery. Six one-milligramme needles were used in this case for seven days to "fence in" the lesion. Colostomy was done in the remaining three, as a pure palliative in two and as a preliminary to perineal excision in the other one, the ischio-rectal tissues, *levatores ani* and inguinal lymph glands being cleared out as well.

General Conclusions.

1. The disease is in some way often associated with polyosis of the pelvic colon and rectum and it is highly probable that constipation, by encouraging the effect of chronic irritation of retained excreta in a bowel possessing such adenomata, is an influencing factor of high degree in the production of rectal cancer.

2. Early and carefully done colostomy is almost an absolute necessity in the treatment of rectal cancer.

3. No attempt should be made in cancer of the anus or lower segment of the rectum to preserve the external sphincter, except in very early cases treated by radium.

4. Every patient suffering from rectal bleeding, piles (so called), rectal discomfort or chronic sacral backache, especially if associated with early morning looseness of the bowels, should be given the benefit of a thorough rectal examination by the finger if not by a proctoscope.

5. The ideal treatment for cancer of the pelvi-rectal junction and body of the rectum is excision in one (or two) stages by the method of Miles.

6. The method next to be preferred is colostomy followed by thorough exposure of the rectum by the coccygeal approach and the planting around the growth of heavily screened radium needles.

7. The best treatment for epithelioma of the anus, if seen very early, is by interstitially applied radium, followed by surface application through a paste mould. If, however, the patient is seen late, colostomy should be done and radium needles buried to give a total irradiation of about 6,000 milligramme hours. Then two weeks later deep X ray therapy should be applied to the inguinal glands.

References.

(1) J. P. Lockhart-Mummery and Cuthbert Dukes: "Precancerous Change in Rectum and Colon," *Surgery, Gynecology and Obstetrics*, 1928, Volume XLVI, page 591.
(2) J. P. Lockhart-Mummery: *Proceedings of the Royal Society of Medicine*, December, 1930, page 206.
(3) Charles Gordon-Watson: "Cancer of the Rectum," *The British Medical Journal*, December 6, 1930.

CANCER OF THE RECTUM.[1]

By BASIL KILVINGTON, M.D., M.S. (Melbourne),
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THE rectum is one of the least satisfactory positions for the treatment of malignant disease. As most growths here are not of the grossly virulent type, some explanation of the poor results is necessary.

Most of the facts brought out in this paper are the result of study of cases of cancer of the rectum in patients admitted to the Melbourne Hospital during the last five years. The advanced state of the growth when the patient comes under treatment is the outstanding feature. In the 78 cases the average duration of symptoms was twelve months, that is, bleeding and diarrhœa had been ignored for this time (these being the most common symptoms).

If the necessity for a rectal examination of patients with these symptoms could be impressed on practitioners the growth would be recognized earlier and the results would be greatly improved.

In the last five years sixteen patients were admitted to the Melbourne Hospital too late for any operation, and five died in hospital. Forty-one cases were suitable for colostomy only, and seven died in hospital, a mortality of 15%. Only twenty-one patients were suitable for operation, that is, about one in four, and of these four died, giving a mortality of about 20%. Most of these operations were of the Lockhart Mummery type, and as this surgeon has a death rate of about 5%, we in Australia have much room for improvement.

The Operative Treatment of the Malignant Rectum.

The growths removed by surgical operation are nearly all of the carcinoma type and are divided into: (*a*) growths of the anal margin, (*b*) growths of the anal canal, and (*c*) growths in the true rectum as far as the sigmoid junction.

In the operative treatment there are two outstanding points. The first is that removal will be accompanied by a considerable mortality which cannot be got below about 5% when perineal removal is carried out, and about 20% when the combined abdomino-perineal route is used. We fall far short of this result in Australia because, I think.

[1] Read at the Second Cancer Conference, Canberra, March, 1931.

individual surgeons do not get the experience that is to be obtained in the crowded areas served by English and European clinics.

The second point is that almost every patient operated on has to have a permanent colostomy for the rest of his life.

With these reservations the final results are not unfavourable, but this depends on seeing the patients much earlier than we do in Melbourne.

The surgical routine can be briefly stated as follows:

As a first stage in all operations a colostomy is done, either to relieve obstruction (for this is sometimes even now the first time the patient comes for treatment) or as a preliminary to more radical measures.

When the abdomen is opened, an examination is made for secondary deposits in the liver, and if these are present, of course nothing further is to be attempted. If there be involved glands in the retroperitoneal space removal may still be attempted and deep X ray therapy given later on, but in many cases of this group it is problematical whether it be worth while.

If the growth is locally operable and there are no obvious secondary deposits, the procedure lies between the use of a severe combined abdomino-perineal method with a very high mortality but a thorough clearing out of the disease, or (if the trouble is low down) a perineal removal with a less ideal clearing out of possible infected tissues and glands. For the average surgeon the extra mortality of the first procedure greatly exceeds the number of recurrences that the less thorough perineal removal entails, which means that a perineal removal should be done when possible. This has always been Mummery's contention.

Radium Treatment of the Malignant Rectum.

The radium treatment of rectal cancer is by all authorities given second place to the operative removal. The cells in this type of growth are highly specialized and the arrangement is very like that in intestinal gland tissue, far removed from elementary cells which are ideal for the emanations of the γ rays. Yet in spite of this, improved technique has resulted in a definite recession of some rectal neoplasms. Of eight growths exposed to radium at the Melbourne Hospital all were advanced, six were really inoperable and the patients died later on. Three of these manifested disappearance or very marked diminution of the local growth, but died of internal dissemination, so the results of radium cannot be said to be disappointing if it is used in early cases. (These patients were under the care of Dr. Clendinnen and Dr. Kaye Scott.)

Methods of Application.

In cancer of the anus the position is ideal for radium treatment, and radium can be implanted without a preliminary colostomy (which is usually necessary for all operative measures). Two of our cases were of this nature. The scar may later narrow the anal aperture, however. It is wise in this group to apply radium packs to both inguinal regions, for it is in this region that gland involvement occurs. The radium needles are implanted through the perineal tissues. In the female needles can be implanted through the vaginal wall where the growth is involving the anterior rectal wall. It is generally recognized that applications of radium in the rectal canal are inadvisable, as they lead to severe reactions and proctitis with insufficient radiation of the spreading portions of the growth.

For the ordinary radium application a dissection is necessary to allow of the needles being placed in and beyond the tumour under direct vision.

This surgical approach may be through the perineal region by the method described by Neumann and Coryn which entails removal of the coccyx and exposure of the bowel; often division of the *levatores ani* is necessary. The radium required is as much as sixty milligrammes, which is left in about seven days. The wound of access heals slowly and always suppurates. This procedure falls not very far short of a Mummery operation in severity without being as complete, so it is generally replaced by this operation unless the growth be more or less fixed. In these circumstances a fixed tumour may later become capable of removal, and this fixation seems a distinct indication for radium treatment.

The second approach for radium implantation is through the abdominal wound, and has been worked out by Sir Charles Gordon Watson. He uses radon seeds, but it appears that there is no reason why needles should not be inserted with strong thread to allow of their removal. The question of peritoneal infection is an anxious one. My friend Julian Smith suggests shutting off the pelvic region at the time of implantation by means of omentum, thus localizing any infection to the lower part of the abdomen.

The main conclusions I should like to see discussed are:

1. The necessity for a much earlier diagnosis in rectal cancer.

2. The advisability of radical operation in suitable cases, where the growth is not involving surrounding structures locally and where freedom from secondary deposits in the liver is revealed by laparotomy. This is determined at the time of the colostomy. As each individual surgeons sees very few cases in the Melbourne Hospital (it works out at about one case a year for each indoor surgeon), it would apparently be wise for one man to treat all these cases at each hospital. It is in this way that the lower mortality that such experts as Miles and Mummery report is partly explained.

3. In cancer of the anal opening that radium treatment be given first place, as there is a chance of cure with the retention of the natural functioning of the anus. Colostomy is not necessary.

4. That radium be tried when the liver is not involved, but when the local tumour has involved structures such as the prostate or the lateral pelvic

wall. Occasionally such a growth may later on become surgically removable.

5. Many growths are locally removable, but have secondary nodules in the liver. Owing to the unsatisfactory response of liver growths to deep therapy nothing should be done to these except a colostomy, if it be necessary to relieve pain or obstruction.

THE PHYSIOLOGY OF THE ALIMENTARY TRACT CONSIDERED IN RELATION TO THE MORE COMMON DISORDERS MET WITH IN RADIOLOGICAL PRACTICE.[1]

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THE subject allotted to me tonight is a very wide one, and I propose to limit myself to a consideration of motor phenomena only. These quite obviously are the main concern of the radiologist. The secretory mechanism of the gastro-intestine, with its many absorbing problems, I shall pass by.

The gastro-intestinal tract of man, with its unidirectional passage of food materials and *débris*, is a highly complex and beautifully balanced mechanism. In its normal functioning muscle contraction and nerve stimulus play their individual parts. In some lowly forms of marine animal life we find interposed between the surface epithelium of the creature and its muscles a nerve net. This net is, however, not polarized, and will conduct stimuli in all directions. Higher in the animal scale we find that these primitive nerve nets are polarized, and as we ascend still further, the more detailed does the neuro-muscular system become. In the gastro-intestine of man there exists a very complex system of association fibres so that control of stimulus (with its subsequent muscular contraction) results in complete coordination between one muscle segment and another. In spite of this elaborate development of nerve control, the gastro-intestine remains highly autonomous. Excised segments of stomach and bowel, when placed in oxygenated Locke's solution, will, under suitable circumstances, give rise to peristaltic and rhythmic contractions for a variable period of time.

From this and similar experimental observations we draw a very important conclusion. The gastro-intestine carries within itself the mechanism essential to peristalsis. We can accept it then as an established fact that the physiological basis of peristalsis is to be found in the wall of the gut. The intestinal wall shares in that tendency to rhythmic contraction which is seen universally in muscular tissue. This inherent rhythmic tendency is controlled and coordinated by nervous stimuli coming by way of Auerbach's plexus. Alvarez likens the bowel segments to a centipede with a colony of legs. Each leg can walk and attend to its own affairs. But for satisfactory progression to be obtained they must all be coordinated. So with the bowel segments. Auerbach's plexus picks up stimuli coming from the mucous membrane, after these have been collected by Meissner's plexus and transmitted by association fibres. This would explain how it is possible for peristaltic movement to be influenced by the chemical nature of the intestinal contents. Auerbach's plexus is subject to extrinsic control by way of the sympathetic and autonomic nervous systems. The vagal fibres are motor to the bowel muscle, but inhibitory to sphincter activity. The sympathetic fibres proper have the reverse effect. In laboratory animals it is a very simple matter to show that if we stimulate the ureter or the intestine at a certain point there appears a tonic ring from which waves are given off in both directions. Alvarez draws the analogy between these waves and the ripples which arise when a stone is thrown into a pond, and which spread outwards concentrically. The physical conditions underlying the two sets of events are very similar. The level or "potential" is raised at a given point and movement takes place until equilibrium is restored. If a stone is thrown at a second point, the waves arising from this focus will approach towards those of the first in such a way that some of them are slowed or even stopped. Similarly, if a second tonic ring is made in the bowel or ureter, the waves approaching from the first point of excitation are blocked. If, instead of throwing the stone into a pond (which naturally is level before we agitate the surface), we throw it into a running stream, the result is somewhat different. The water has an established gradient and the resulting waves of disturbance flow more easily down stream. In tubular organs, such as the bowel, waves of peristalsis will pass more easily in the distal than in the proximal direction, because the physiological gradient is down hill from stomach to colon. This conception of the existence of physiological "gradients" with waves of muscle activity of necessity flowing "down hill" from a higher to a lower potential is of great use when we attempt to visualize gastro-intestinal muscular action. It is quite easy to see how acute inflammation (or other pathological change) may raise the "potential" at some given point with the production of anti-peristalsis and such symptoms as nausea and vomiting. Different segments of the bowel show individual properties. Thus the rate of rhythmic contraction in the duodenum is about twenty per minute. But it is only ten per minute in the ileum. Variations can be shown in the behaviour of separate portions of bowel in relation, not only to rhythmicity, but also to tone, irritability and latent period. In the stomach the fastest rate of contraction is seen in muscle excised from the lesser curvature near the cardia. The auricles of the heart, when completely dissociated from the ventricles by heart block, are found to beat more rapidly than the distal chambers. Proximal cardiac muscle has a higher rhythmic rate than distal. It would appear

[1] Read at a meeting of the Radiological Section of the Victorian Branch of the British Medical Association on October 21, 1930.

that in the small bowel this rate varies inversely as the distance from the pylorus. It is feasible that in the primitive digestive tube it slowed down as it progressed distally from pharynx to anus. In the stomach the remnant of the primitive digestive tube is present along the lesser curvature, and it is here that we find the most rhythmic tissue. The opportunities for examining the behaviour of strips of muscle excised from the stomach and bowel of man are very restricted and we have to rely largely on conclusions drawn from animal experimentation. Alvarez has had such opportunity and is of the opinion that human muscle does exhibit similar properties to that of the ordinary laboratory animal. Rush-waves, as seen in the rabbit, have been observed in the loops of small bowel of a large ventral hernia in a very thin woman in whom gastric peristalsis was seen to terminate in eructation. Further work will be necessary to give definite proof of the existence of gradients of rate, amplitude and tone, and of vascular and metabolic activity. But the evidence in favour of these is really quite striking. We can briefly summarize the various types of intestinal movement as follows.

Stomach. Regularly recurring waves run in the stomach from cardia to pylorus. Reverse peristalsis is pathological. The subject of gastric peristalsis I shall discuss in more detail a little later on.

Small Intestine. Rhythmic segmenting or mixing movements occur in the small intestine and have little action in forwarding the intestinal contents. From time to time rush-waves occur which pass the food along. Reverse peristalsis is probably abnormal, except in the terminal part of the ileum and in pyloric regurgitation at the end of gastric digestion.

Colon. Sluggish local contractions and haustral movements occur in the colon. Rush-waves occur at long intervals. Reverse peristalsis is physiological, particularly in the right half of the colon.

As we pass now from these experimental considerations to the more directly radiological aspect we will be able to see constantly how they may be applied.

Achalasia of the Cardia.

Time will not permit me to discuss all the structural and organic lesions met with in routine gastro-intestinal radiological practice, so I will confine myself to some of the conditions seen which more directly concern function. The first of these is achalasia of the cardia. This I think may be defined as dilatation of the œsophagus without organic (or structural) obstruction. The œsophagus shares in the common vagal innervation and it would appear that the musculature at the lower end does function in the same way as sphincters elsewhere. Doubtless this "sphincter" is innervated by sympathetic fibres as well.

We can demonstrate no constant relationship between the secretory activities of the stomach and the onset of this condition of "cardiospasm" or achalasia. I have recently seen two cases in which for some obscure reason the right side of the diaphragm was in a position very much higher than normal. The operation of phrenic nerve evulsion had not been done. In both of them there was very definite delay to the passage of barium at the cardiac orifice. In certain cases extrinsic factors causing pressure or distortion of the œsophagus may give rise to this condition. In the great majority this is manifestly not so. Probably some subtle disturbance occurs in the reciprocal relationship between distal musculature and sphincter itself. Whether there is primarily structural damage to nerve endings or not we cannot say. When the condition is fully developed, food is retained in the œsophagus in spite of violent peristaltic efforts to send it on. As viewed fluoroscopically, there is arrest at the cardiac orifice, a variable degree of œsophageal dilatation above, but no true filling defect. Such defects can be easily simulated by food masses lying in the œsophagus and preventing normal filling with the barium. In cases which are not relieved, complete loss of œsophageal tone may occur.

The Stomach.

A somewhat similar condition of obstruction may arise at the pylorus. Screening may show grossly hyperactive gastric peristalsis with constant narrowing of the lumen of the pylorus for, say, a couple of centimetres. This narrowing is unchanged during screening and is present in films. Gastric emptying is delayed and even after the full administration of atropine the spasm persists. Operation will show no evidence of neoplasm or of ulcer, but merely an increased density of the muscle at the pylorus. The condition is really a pyloric stenosis, with definite hypertrophy of muscle. No such hypertrophy occurs in achalasia of the cardia. This is, I think, one point in favour of regarding this latter condition not as a true spasm, but rather a failure of relaxation. This condition of hypertrophic pyloric stenosis I have never recognized in adults, possibly because I have mistaken it for early *linitis plastica*.

I suppose there is not a single person here tonight who has not spent many interesting and perhaps weary hours endeavouring to follow gastric peristalsis closely as he sees it on the screen. To me there is no more important duty in the whole range of gastro-intestinal work, and if I appear to dwell unduly upon the study of this function, it is because I am convinced that a thorough study of the gastric motor phenomena is essential to all good work. By graphic methods it can be shown that a wave of contraction beginning at or near the cardiac incisura moves downwards, steadily increasing in depth until the pylorus is reached. In normal cases nowhere is the stomach completely segmented. There can be no doubt that the stomach, considered from the motor point of view, is a single functioning structure. The anatomical and physiological subdivisions described simply do not exist in relation

to peristaltic activity. Screening in the routine way, what is it that we see? Immediately after filling the stomach with opaque fluid the waves are limited to the pyloric end. The *incisura angularis* deepens, and opposite to it, on the greater curvature, a depression appears. This encircling constriction becomes more intense and then moves distally, allowing the greater portion of the gastric content to escape through it back into the body of the stomach. The onset of peristalsis may be retarded possibly because of nervousness on the part of the patient, and can often be stimulated by direct massage.

Gradually it becomes possible to visualize the wave higher and higher in the stomach. Once activity is in full swing waves succeed each other at regular intervals, the depth on the greater curvature being more than on the lesser curvature. Normally only two or three waves are in progress at the same time and they proceed evenly to terminate in the pylorus without jumping or skipping any portion of the gastric wall. This continues until gastric digestion is completed. More than this it is impossible to discover with the screen. Oftentimes, especially in fat subjects, very few of these details can be observed. Of recent years the aid of the motion camera has been invoked in the study of gastric peristalsis. It has been revealed that the several types are movement are more complicated than we formerly thought. Some are small, shallow, more or less stationary contractions, producing what looks like rhythmic segmentation; there are tonus changes, peristaltic waves running to the pylorus, and peristaltic waves changing into systoles of some or all of the *pars pylorica*—waves that stop at some particular point, usually in the prepyloric area. There are others that begin at the same point. Contractions of local origin may be superimposed on travelling ones, and occasionally waves of reverse peristalsis occur. These, considered collectively, present a truly bewildering assortment, but fortunately they are not all detectable in routine fluoroscopy. In the distal third of the stomach it may happen that while a wave is travelling to the pylorus on the longitudinal muscle, the circular muscle contracts systolically. Perhaps sufficient has been said to show that gastric peristalsis, as viewed by these micro methods, is exceedingly complex. To return again to the more purely clinical side of the work. Sluggish peristalsis with diminution in the number and depth of the waves is seen under varying conditions. One constantly sees people of the *anorexia nervosa* type in whom the stomach appears to be almost inert. Diagnostically this "damping down" of muscle activity is much less important than localized absence of peristalsis, of irregular peristalsis, and of grossly over-active contraction. The complete inertia of the stomach in advanced leather bottle infiltration is very striking. If peristalsis is absent from any localized portion of the stomach wall, it is very suggestive that there exists in that area an organic lesion. The detection of this change may be the earliest evidence of a localized gastric carcinoma, and may be possible before any filling defect is demonstrable. The discovery of this phenomenon taxes the skill of the most competent fluoroscopist.

Hyperperistalsis is seen typically in lesions of the duodenum. The waves are increased in number and show an abnormal depth on both lesser and greater curvatures. This type of contraction does not mean that the lesion, such as ulcer, is obstructing. Reflex irritability in my experience never produces the degree of hyperperistalsis occasioned by intrinsic duodenal lesions. The hyperperistalsis of pyloric and immediately prepyloric lesions is more erratic in character and affects the greater curvature chiefly. Antiperistalsis I have seen only in association with gross organic lesions. It is important to recognize that initial gastric emptying is not a true index of the general rate of evacuation. The passage of food through the small bowel is fairly constant and the advance of the head of the meal beyond the caecum is the best measure of gastric hypermotility. Ulcer of the duodenum, *achylia gastrica*, and carcinoma of the stomach may all be associated with such hypermotility. If the small bowel itself should be irritated, then this test ceases to have any bearing.

There are very few cases in which the failure of the stomach to empty in six hours is due to anything but an intrinsic organic lesion. I remember seeing one case, however, in which a large six-hour residue was secondary to a large infiltrating retroperitoneal sarcoma. The stomach was not involved directly. Spasm of gastric muscle provides us with many interesting and confusing problems. This may be confined to the pylorus, or, as in hour glass spasm, to one particular segment of the stomach; again, it may be quite diffuse. The incisura of gastric ulcer is indicative of the site of the lesion and quite often the ulcer itself is demonstrable. The reflex spasm arising from ulcer may be quite perplexing. Thus a regional spasm may occur involving the *pars pylorica*, even though the ulcer itself is high up in the *pars media*.

Recently I saw a case in which a very definite delay was present at the cardiac orifice very closely simulating cardiospasm. But once the meal entered the stomach, it hurried on, leaving so rapidly that it was impossible to get adequate filling for visualization or satisfactory films of gastric contour. At operation the only lesion present was an active ulcer of the lesser curvature in the prepyloric area.

It is important to remember that carcinoma may be accompanied by marked spasm. This tends to increase the deformity, and actually the true filling defect may be much smaller than would at first sight appear to be the case.

Occasionally a severe spasm is seen which could reasonably be called a "total gastrospasm." The stomach is hypertonic, diminished in size, held up under the left costal margin and apparently inert. For a while the food is retained high up in the cardia and the diminished distensibility is such as to mimic closely leather-bottle carcinoma. In my own

experience such cases are most commonly associated with a condition of chronic uræmia, with a very high blood urea estimation, but many acute toxæmic states may produce it. It is very difficult oftentimes to decide whether gastric distortion is due to organic lesion with local spasm, to spasm of gastric but not local origin, or to an entirely extrinsic cause. Deformity due to local organic lesion is constant in site and in shape. The outline is usually sharp. It is not influenced by atropine.

Reflex spasm is not constant in duration and is variable in site and intensity. Only rarely does it interfere with gastric motility and it disappears after atropine. Recently I reviewed one hundred and sixty cases of proven gastric carcinoma. In this paper I showed that 70% of the cases had reached an advanced stage before being submitted to X ray examination. The failure of early diagnosis clearly did not rest with the radiologist. The present mortality in this disease, whether treated surgically or not, is about 95%. If we are to save these patients, much earlier diagnosis is necessary. Given the opportunity, we must hope some day to diagnose the presence of gastric neoplasm before filling defect is present. This will involve an accurate knowledge of gastric peristalsis and a capacity to recognize slight deviations from normal. Probably the earliest sign in this disease is the absence of peristalsis from a certain area in the gastric wall. The wave is seen to advance to this area, skip it and then resume distal to the site of infiltration. Serial films will often confirm this point and direct palpation may demonstrate an appreciable loss of elasticity or distensibility before gross change in contour has occurred.

Retention of gastric content is generally due to obstruction by the tumour infiltration, but if the lesion is ulcerative, there may be intense reflex spasm of the pyloric segment with delayed emptying. Non-malignant ulcer may, in a comparatively late stage, produce obstruction by cicatricial contraction, but this is relatively uncommon, and retention in these cases is due to spastic contraction of the pyloric segment. Duodenal ulcer is commonly supposed to produce obstruction only by cicatricial contraction. I feel sure that this is often increased by local œdema at the ulcer site, and I have myself seen great improvement in gastric emptying after adequate treatment. If the stomach gradient is upset by an ulcer near the pylorus which has greatly increased the irritability of that region, reverse peristalsis may be originated. A wave originating at the cardia has to travel a little faster on the greater curvature than on the shorter lesser curvature, if the two ends are to reach the pylorus at the same time. Remembering that the lesser curvature contains the most highly specialized tissue, it is not surprising that a lesion of this site may alter the rate of conduction, with consequent irregularity of peristalsis. If a sleeve resection of the stomach is being done, theoretically the sleeve should be a little wider on the greater curvature than on the lesser.

We need not be surprised if, after such a gross interference with the stomach as is caused by the operation of gastro-enterostomy, the patient does not always feel perfectly happy. Doubtless if the pyloric segment could be reversed so that the resulting gradient was towards the stoma and not the pylorus, the unhappy victim might lead a more placid existence.

The Small Intestine.

Time will not permit of any full discussion of the progress of a meal through duodenum and small bowel, or of the gastro-colic and gastro-ileal reflexes. After a meal is given by mouth we find that one and a half hours later it is in the left and middle part of the abdomen, that after two hours it predominates in the middle and lower part of the abdomen, and that after four hours only a little is left in the ileum, the head being in the caecum. At six hours there is very little in the terminal part of the ileum; at eight hours this should be empty. If there has been purgation the day before, the passage through the small bowel is materially increased. Practically the only sign of importance radiologically, as far as the jejunum is concerned, is obstruction. If this has occurred, the signs are typical. The delicately ribbed *valvulæ conniventes* show clearly in the loops of dilated bowel. These loops tend to arrange themselves vertically. I am showing a film taken in a case of carcinoma of the jejunum, the obstruction being about 60 centimetres (two feet) from the duodeno-jejunal flexure. It is surprising how much detail of small bowel can sometimes be seen in a simple film, provided the coils are distended with gas. Fortunately organic obstruction of small bowel sufficient to make it clinically important is comparatively rare in routine practice.

The Colon.

As I wish to spend some time in consideration of the function of the colon, I will hurry on. It is difficult to say what are the standards by which we estimate the normality of the colon. One thing is certain. Normal function may exist within the widest possible range of position. Even though we find that in the erect posture the whole colon is below the level of the iliac crests, it is still possible for that colon to perform its duty in a perfectly satisfactory way. Usually the hepatic flexure is situated at the level of the first lumbar body and the splenic flexure higher up under the left side of the diaphragm. If we examine the contour of the colon by means of the opaque enema, we find that when the fluid at first begins to run the contour is smooth, but that very quickly two muscular properties can be shown; first, by the existence of a general tonus, secondly, by the presence of haustration. The haustra normally are most marked in the ascending and descending portions. These two phenomena are more easily shown by meal than by clysma. In the rectum the valves of Houston produce one or more acute unilateral indentations.

I have never seen any evidence of peristaltic activity when examining the colon, except on one

occasion when I was fortunate to observe a mass move up the terminal ileal contents into the caecum. It is now fairly generally accepted that the chyme reaches the terminal part of the ileum in about three and a half hours and is there delayed for about an hour ("physiological terminal ileal stasis"). The hepatic flexure is reached in six hours, the splenic flexure in nine, and the pelvic colon in about twelve hours. Probably the caecum and ascending colon play a relatively passive rôle, their filling depending largely on the activity of the ileum.

Time will not permit of a discussion of the question of mass peristalsis in the colon, but I do wish to discuss the question of tone and of certain types of constipation.

In recent years a good deal of attention has been paid to chronic spasm of the colon as a cause of abdominal pain. I have been able to satisfy myself on many occasions that it does closely simulate organic abdominal disease. Many of the patients are of the nervy type; others are particularly active and vigorous men and women of business. The condition may be surprisingly intermittent, and one factor in its production is apparently an unduly irritable reaction on the part of the bowel to extrinsic nervous factors. We know that the general musculature of the colon may be thrown into the most violent spasm after exposure to foreign protein to which the patient is hypersensitive. This lends colour to the view that colonic spasm may be the result or the manifestation of nervous disorder. The pain from which these people suffer is doubtless due here, as elsewhere, to increased tension in muscle fibres. There is no increase in motility (they do not suffer from diarrhœa), but exaggerated tone is present and there are rigidity and narrowing of the lumen. The stool is "actively" retained. The descending colon is easily palpable to the examining finger. These cases should be investigated by meal and not by clysma. The spasm relaxes before the weight of the opaque fluid and is not seen when this method is used. It is generally more marked in the descending colon, and may be limited to this area alone. We must discriminate between the normally hypertonic colon and that which may be described as showing "spastic dysfunction." Spasm in the distal part of the colon is often associated with stasis and perhaps dilatation of the ascending colon. I believe that caecal and ascending colon stasis is only very rarely primary. I admit that we do see cases of caecal stasis and ptosis in which there is no abnormality of the distal colon, but they are less common than the secondary variety. The normal colon completely empties of barium in the forty-eight to seventy-two hour period. The proximal part of the colon may be empty in twenty-four hours. Generally the caecum and adjacent colon discharge their contents before the proximal part of the transverse colon. A residue in the caecum for forty-eight hours after a meal, with the adjacent colon empty, is due to true caecal stasis. In the distal part of the colon we see every degree of abnormal spasticity from simple hypertonicity through the prediverticular state to the fully developed diverticulosis.

Various sphincters have been described, and I think that enthusiasm has carried some observers away. The caeco-colic sphincter, occurring about one-third of the way up the ascending colon, and that described in the mid-line of the transverse colon, are, I think, quite genuine. The former is a fruitful source of annoyance when looking for filling defects in the caecum.

I must confess that I have been constantly disappointed at my inability to demonstrate many of the kinks, bands and sphincters described by some observers. It is important to recognize that when caecal and proximal colon stasis is present, there may be gross delay in the terminal ileum. Without a knowledge of this fact the appendix may be quite erroneously labelled as pathological, particularly if there is over-filling of the terminal ileal loop.

Diverticulosis, seen most commonly in the sigmoid, is, I believe, the result of long-standing hypertonus or spasm with resulting herniation of the mucosa through the muscular coat of the bowel.

Remembering the double nerve control of the colon, it is feasible to regard many of its disorders of function as being due to loss of balance between the sympathetic and autonomic systems.

I have only once had the opportunity of reexamining radiologically a patient with general colonic atony subsequent to the operation of ramisection. The enormous increase in the capacity of the colon seen at the first examination had not changed, but the haustral formations did seem to be rather more regular than before. The true dyschezial cases, in which the loss of tone and the stasis are confined to the rectum or to pelvic and sigmoid colon, should all be recognized. In the young adolescents they form a large percentage of those suffering from constipation and with the proper care are nearly all curable.

This paper is of necessity very incomplete, but I have endeavoured to give an outline which will be of help in the daily work.

I hope that this will in some small measure be achieved and your interest in the working of the gastro-intestinal mechanism thereby stimulated.

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THE SCOPE OF DIET THERAPY.[1]

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THE science of nutrition is still in its infancy and the possibilities of diet in the medical treatment of

[1] Read at a meeting of the Alfred Hospital Clinical Society, November, 1930.

the future are great. Recent contributions to the physiology of growth and reproduction and the application of vitamin deficiency work to the treatment of the sick, together with a more thorough understanding of the effects of overnutrition and undernutrition, will, without doubt, improve therapeutic methods. Too often the history of past treatment reveals the fact that through anxiety to treat a specific disease medical practitioners have broken the rules of adequate nutrition and minor deficiency disorders, many times unrecognized as such, have resulted.

Diabetes.

The importance of dietary control in diabetes is a well established fact and as such demands no further mention here, since the object of this paper is to draw attention to the application of recent developments in the science of nutrition to therapy.

Nephritis.

The limitation of protein in the diet of the nephritic has been a fairly uniform mode of treatment, but the rigidity of this restriction has been the subject of much discussion. The degree of safety of the restriction of protein depends upon the character of the rest of the diet, mainly upon the inclusion of adequate protein-sparers. The importance of an adequate number of calories in the prevention of the anæmia of nephritis is now recognized. The question of acidity and basicity of foods has received much attention from some investigators,[1] though there is certainly no justification for the over-emphasis by certain food faddists of the responsibility of the acid diet in the ætiology of the disease. In nephritis, where the normal mechanism for maintaining the neutrality of the body is under strain, definite benefit may be derived from alkaline diets.

Some comparatively recent experimentation with animals suggests new lines of treatment in human nephritis. Maclean, Smith and Urquhart[2] have shown that rabbits fed on diets from which green food is excluded become nephritic, and that the inclusion of cabbage leaves in the diet (even though the cabbage may contain a high percentage of protein) prevents kidney injury or cures it, if it has developed. They suggest that "fresh vegetables may be more important than the usual abstention from protein food" in the treatment of nephritis.

Cox and Hudson,[3] working on rats, report the efficacy of yeast extracts in nullifying the nephrotoxicity of cystin and suggest the application of this discovery to the treatment of human nephritis. They state that this protective substance of yeast is probably distinct from any of the known human accessory food factors. Thus recent developments are turning our attention from the view point that the alpha and omega of dietetic treatment of nephritis lie solely in protein control, and causing us to turn to modern research for factors that we may have overlooked in the past.

Hypertension.

Hypertension deserves a word of mention at this stage. Strouse[4] makes the statement that "one of the weaknesses of therapeutic diets as usually practised is the willingness to follow blindly a traditional diet for a given disease." The vogue of so-called "non-protein" diet in hypertension without renal involvement is one such instance. There are no scientific data to suggest that the blood pressure in man increases with the protein content of the diet. Formerly hypertension was considered a symptom of chronic nephritis, a disease in which protein restriction was thought to be necessary. When the symptom hypertension was severed from the nephritic complex, the dietary treatment did not follow along the line of cleavage. The best results are obtained when the simple rule of moderation is applied, not only to the activities of life, but also to the diet of the hypertensive individual.[5] [6]

Gastro-Intestinal Disorders.

Gastro-enterology is a field in which diet therapy is indisputably effective. The dietetic treatment of gastric ulcer has been successful in a large percentage of cases. However, there has been room for great improvement in some of our standard ulcer diets, which have been found on closer analysis to violate certain principles of nutrition.

Constipation can almost always be controlled by diet therapy. High fat diets have been found to be laxative and have become a common treatment for constipation.[7] The inclusion of large amounts of soft bulk in preference to bran and other irritating substances is recognized as a sound procedure.[8] The differential diagnosis of spastic and atonic types of constipation and the consequent institution of specific diet therapy have marked our progress in the treatment of this common disorder.

The use of high caloric diets in typhoid fever[9] is another practice which has become firmly established and needs no lengthy discussion here. Its adoption was a capitulation to the method of placing the treatment of the patient before the treatment of the disease, and the excellent results obtained have proved its wisdom.

Intestinal Putrefaction.

Intestinal putrefaction and its harmful results have been the subject of much recent work and literature. The products of putrefaction, their detrimental effect upon the animal organism and the functioning of the defence mechanism have all been considered. Mitchell[10] has very aptly said:

> It is very easy to exaggerate the case against the harmful results of intestinal putrefaction and to magnify a mere possible, or even reasonable, explanation of pathological conditions into a positive diagnosis.

As an example one might cite the disorder commonly known as "autointoxication." Until recently the underlying cause of this "symptom-complex" was thought, more or less generally, to be the absorption of histamine. However, although histamine is probably normally formed in the intes-

tine and probably in increased amounts in intestinal stasis, experimental work[11] points to the possibility that it is rendered pharmacologically inert in its passage through the intestinal wall. The balance of evidence is against the view that histamine, even if it is absorbed,[12] is the active causative agent of autointoxication. The liver has no pronounced protective action against histamine, except a purely mechanical one associated with its extensive capillary network.

The work of Donaldson[13] and Alvarez[14] explains the typical symptoms of autointoxication on a mechanical basis. The distension and irritation of the lower bowel set up by the retention of fæcal masses cause an irritation of the nervous system which acts as a distributing agent, and all tissues share in the disquieted state.

Although this recent work has tended to disprove the toxic theory of autointoxication and directed attention to the mechanical explanation, there remain certain pathological disturbances in which the inhibition of intestinal putrefaction is considered important. Among these disorders are anæmia, certain types of dermatitis, halitosis, some respiratory infections, and possibly temporary sterility in women.

There are two methods of inhibiting putrefaction in the intestinal tract. The first is by implantation in the intestine of aciduric types of bacilli. The second is by a regulation of the diet, producing a marked change in the character of the contents of the large intestine, thus favouring the growth of an aciduric flora. Putrefaction in the large intestine is characterized by the production of an almost neutral residue,[15] whilst carbohydrate fermentation is characterized by a distinctly acid residue.

The success of implanting aciduric bacteria in the intestine has been variable. *Bacillus acidophilus* or *Bacillus bifidus*, normal inhabitants of the intestine, may be successfully implanted. If the bacterium used is not a normal inhabitant, as in the case of *Bacillus bulgaricus*, implantation is unsuccessful. Even with aciduric bacteria suitable for growth under the conditions in the large intestine, the most successful implantation demands a diet regimen which causes the persistence of carbohydrate residues. Hence the most practical and effective method of modifying the intestinal flora so as to reduce putrefaction is to introduce into the diet those carbohydrates which will persist in appreciable amounts throughout the intestinal tract. In general those carbohydrates which are difficult of digestion and absorption are best suited to this purpose. Maltose, glucose and sucrose, which are readily digestible carbohydrates, are ineffective, while lactose and dextrin are highly effective. Hence the success of this popular therapeutic measure against intestinal putrefaction, namely, the implantation of aciduric bacteria, is largely dependent upon the establishment of a suitable carbohydrate medium in the large bowel by a proper dietary regimen.

Functional Anorexia and Vitamin B.

The association of anorexia with vitamin *B* deficiency is one of the later contributions of research workers. Bartlett,[16] in a study of anorexia in 1,471 children of ages ranging from one to fourteen years, found that 35% of them belonged to the functional group in which no organic cause could be found. The most reliable method of treatment of this condition consisted in the addition of calf's liver, broiled beef steak and lamb's kidneys to the children's diets.

Barnett Sure,[17] working with rats, produced anorexia by a diet deficient in vitamin *B* and cured this condition by vitamin *B* therapy in the form of yeast concentrates. The response to this therapy was most marked when highly concentrated preparations were employed. This work of Sure supports Bartlett's previous work, as the liver is recognized as a depôt for the storage of vitamin *B*.

Plimmer and Rosedale[18] have recently suggested that there is a deficiency of vitamin *B* in the diet of the English people and that the daily food intake shows that an insufficient amount of this vitamin is eaten to balance the white flour, sugar and margarine of the ration. They maintain that this deficiency is closely connected with the origin of the common gastro-intestinal troubles of the present day. It is suggested that the functional anorexia so frequently encountered in man may be largely attributed to the cumulative effect of vitamin *B* deficiency.

Obesity.

The dietetic management of the obese is of interest to both physician and surgeon. There has been a great deal of discussion regarding the ætiology of obesity and the percentages of cases to be classified as exogenous or endogenous. However, the evidence supports the unshakable law of the conservation of energy, and obesity is a sign that the caloric intake has for a considerable period exceeded the energy expenditure.[20] Modern therapy for the obese dictates a diet relatively high in carbohydrate and low in fat. The caloric intake is determined usually by the patient's basal requirement, calculated from the normal weight for his height, and the protein level is maintained at normal or slightly higher than normal requirement.[21] The theoretical explanation is that the patient burns his body fat, thus increasing the ketogenic factor in his diet, and the inclusion of high carbohydrate insures him against any mild symptoms of acidosis. An additional advantage of this regimen is its palatability, which is more likely to secure the cooperation of the patient.

Newburgh and Johnston[22] [23] [24] have recently commented on the fact that a fat person suddenly placed on a low caloric diet retains enough water in his tissues to mask the loss of body fat for considerable periods. Their obese patients, when losing body tissues, held or even gained weight for considerable periods, the longest being sixteen days. In all cases there was a sudden loss in weight later

as the water was eliminated and a return of the weight curve to the point predicted from the daily loss of body tissue.

Anæmia.

The importance of certain dietary factors in blood regeneration in both pernicious and simple anæmia has been frequently reported in the literature. This was so startling, especially in pernicious anæmia, that due emphasis has been placed upon it and no further mention of it need be made in this paper. The dietetic treatment in pernicious anæmia is a specific treatment, though the exact nature of the factor involved is still unknown. However, in the so-called secondary anæmias several factors may help in blood regeneration, so that specific liver therapy is not indicated. Attention is being directed to aluminium, copper, manganese and zinc in addition to iron in hæmoglobin regeneration, and their importance is emphasized by recent experiments.

Epilepsy.

The ketogenic diet in epilepsy is an example of the use of diet as a medicinal measure. The improvement in the condition of certain epileptic patients with starvation and the consequent acetonuria first drew Wilder's[25] attention to the possibility of the use of high fat diets in the treatment of epilepsy. Since the first experimental diets were initiated in the Mayo Clinic in 1921, the practice of adopting the ketogenic regimen for idiopathic epilepsy has steadily developed until now it is generally accepted as the best of the known modes of treatment.

The first hypothesis in explanation of the results obtained was that the aceto-acetic acid behaved pharmacologically as an anæsthetic, having a similar action to that of "Luminal." This, however, does not throw any light upon the differing results obtained with adults and children.

Barborka[26] states that the benefit derived from ketosis may be due to definite metabolic changes. Certain elements in the ketogenic diet may exert a buffer action in maintaining the balance in the conduction mechanism of the nervous system.

In general it may be said that better results are obtained in the treatment of children than in adults, and that better results are obtained in patients subject to *grand mal* than in those subject to *petit mal* only. Brain and Strauss,[27] working with children, state that 31% were entirely freed from attacks and that the number of seizures was definitely reduced in a further 23%. Barborka[26] found that in a group of thirty-two adults seven were completely controlled, twelve were definitely improved, and thirteen were not benefited. Many of the latter, however, were not maintained in a state of ketosis.

It has been the experience of all workers that the general health of patients on the regimen is improved. Usually, shortly after the commencement of treatment a distinct improvement in the mental demeanour of the patient is also noted. Many patients become definitely less irritable, even though they are not benefiting otherwise.

Talbot[28] states that in his experience patients show an actual constitutional improvement, their resistance to disease is greater and their susceptibility to intercurrent infections is lessened. Children on a ketogenic regimen gain weight and grow normally. However, since ketosis tends to stimulate calcium secretion,[28] [29] Talbot recommends the giving of two to three grains of calcium lactate daily during the period of prolonged ketosis.

Irvine McQuarrie[30] emphasizes the importance of the reduction of fluid intake in the maintenance of ketosis, especially in stubborn cases. He also advises for children[31] a higher percentage of protein than has been given previously. The chief factor responsible for this excessive demand on the protein is the ketosis, which taxes the protein molecule for its ketolytic fraction.

Surgical Treatment.

After this long discussion of the dietary management in medical conditions, it is well to stress the place of diet in surgical treatment. The use of a high carbohydrate diet as a preoperative measure is accepted as a definite safeguard against postoperative acidosis.[19] The fats are usually reduced to a minimum and carbohydrates are given to excess, often in the form of sweetened fruit juice. Food which necessitates chewing is often recommended in post-operative treatment in place of the soft diet previously prescribed. Dry toast, broiled steak and chops (chewed, but not swallowed) are recommended to promote peristalsis and the reestablishment of the normal flow of the gastric juice.

The exophthalmic goître patient lends himself to very helpful preoperative diet therapy, a fact which is frequently overlooked by the surgeon. The patient is usually brought into hospital for a period of rest before operation, and it is during this period that diet therapy should be initiated. Exophthalmic goître is characterized by an increased basal metabolic rate of from 20% to sometimes as much as 100%. If the patient's intake of food is raised accordingly and he is given complete rest in bed, he can be made to gain in weight so that a much better operative condition is assured. From a practical standpoint these patients are most satisfactory subjects, for they will take with alacrity a diet representing as many as 5,000 to 6,000 calories.

In a single paper on any subject as wide as "The Scope of Diet Therapy" one could not hope even to touch upon nearly all its phases. Those things which have been omitted are more numerous than those included. The importance of diet in pregnancy and lactation well deserves discussion as a separate entity, and so, in fact, do most of the subjects so superficially treated here. Arthritis, allergic disturbances, cardiac failure, colitis, the deficiency diseases and many others have not been even mentioned. The physiological effects of vitamins and the relationship of these effects to the treatment of the sick have scarcely been dealt with.

However, the purpose has been to present some new phases of the scope of diet therapy readily applicable to our hospital work here, and a revision, with the underlying reasons, of some of the older dietetic methods. If a further extension of diet therapy in the hospital occurs, if a better understanding exists between the doctor (physician or surgeon) and the dietitian as to the cooperative service which it is possible to render, and if, most important of all, better care of the patient results, then this paper will have fulfilled its object.

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Reports of Cases.

LOCAL ANÆSTHESIA IN THE REDUCTION OF FRACTURES.

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I SHOULD like to report four cases which I am sure must be of general interest. There will be very few practitioners who are not aware that the reduction of simple fractures is possible under local anæsthesia alone, yet I feel confident that the method is not in such general use as its simplicity and efficacy should warrant.

I do not recollect when I first heard of this technique, certainly some considerable time ago, but it was only after reading a very excellent article in THE MEDICAL JOURNAL OF AUSTRALIA by Dr. Corlette that I definitely made up my mind to try it, and a suitable case presented itself almost immediately.

A young man of twenty-four years was brought to me and a screen examination showed a transverse fracture of the right femur in its middle third. Directly under the screen I inserted a long, thin needle through the *vastus lateralis*, between the broken ends, and injected fifteen cubic centimetres of Parke, Davis and Company's "Adrocain." Reduction was easily and painlessly attained after waiting twenty minutes.

The leg was put up in a Mackintosh splint; 0·016 gramme (one quarter of a grain) of morphine with 0·4 milligramme (one one-hundred-and-fiftieth of a grain) of atropine was administered, and the patient dispatched by car to public hospital forty miles away, over a not very smooth road. I

subsequently learned that the journey had been almost normal and there had been no necessity for the driver "to crawl," as the patient had had no pain.

The next case was that of a man of thirty-five years who had broken both bones of the leg, the tibia in its lower third and the fibula in its upper third. The fracture of the tibia was spiral and that of the fibula comminuted. Fifteen cubic centimetres of "Adrocain" were divided between the two fractures and the leg, after reduction, again painless, was secured in an old plaster case. I drove the patient in to private hospital over a horrible road at my normal pace, which is not slow. When we got there I found the leg had so shifted by the jolting that it was lying half off the back seat and must have been subject to considerable strain, yet the patient maintained he had been quite comfortable all the way. In hospital this leg was set in plaster by the following method, which is another boon and a blessing.

The foot was first encased in plaster up to within 5·0 or 7·5 centimetres (two or three inches) of the fracture in the tibia; this segment was allowed to set; then the upper part of the leg down to the fracture in the fibula was encased and allowed to set. One of the sisters then took a good grip of the solidly emplastered foot and pulled. I was much surprised to find how easy it was to extend the muscles. Accurate apposition was easily secured under the X ray screen, and then the third segment of plaster of Paris was applied, encircling the fracture and joining up the superior and inferior segments. The leg is now as if it had never been fractured. There is not a fraction of shortening and I think this may be fairly attributed to the local anæsthetic overcoming muscular spasm. I cannot recollect who is responsible for the three-segment method of applying plaster of Paris bandages, but whoever he be, he has my grateful admiration.

My third case was a fractured clavicle in a youth of seventeen years, a red-headed, highly organized individual who was the reverse of stoical. I could hardly get near to him in the beginning, but after injecting eight cubic centimetres of "Adrocain" I was unable to elicit pain. The final case charmed me so much that I decided to blazon abroad my faith in local anæsthesia for fractures.

A married woman, aged thirty-one, and looking a charming eighteen, *petite* and petrified with apprehension, presented herself with a fracture of the styloid process of the right radius. There was impaction and dorsal displacement, the ulna was not broken; 0·016 gramme (one quarter of a grain) of morphine and 0·4 milligramme (one one-hundred-and-fiftieth of a grain) of atropine calmed her generally, and I then injected fifteen cubic centimetres of "Adrocain" all round the end of the radius. This at the time caused the husband to faint. I was reminded of the story of the old family doctor who, in response to the distraught young husband pacing the floor and exclaiming when he heard his wife groan during a labour pain: "I can't stand it, Doctor, this is killing me," says: "Calm yourself, my dear fellow, I have attended five thousand births and never lost a father yet." All pain in the wife was quickly abolished and reduction of the fracture was pleasant for both of us and easy for me.

The great objection, I suppose, and surely the only rational one, will be the possibility of introducing infection, but surely if the most scrupulous care be exercised in securing asepsis, and if the very finest and sharpest needle be used, the risk must be very slight. Balanced against this objection, real but remote, there are so many and such great advantages. Approximate reduction may be performed by the roadside, quick and not dangerous (if the fracture is well and strongly bound up) transport is possible, and final adjustment is consequently carried out at the earliest moment after the accident. The dangers of general anæsthesia are avoided as well as their unpleasant after-effects. Also good and, it seems to me, prolonged muscular relaxation is obtained. Again, less assistance is necessary, which is a factor of importance in the wilds, and the patient's cooperation is retained.

"Adrocain" is best bought in rubber diaphragm capped two ounce bottles. It is 1·5% solution with one in 100,000 adrenalin and 0·5% chloretone. In this form it is always immediately available.

Reviews.

HEART DISEASE.

WE have to hand a very excellent book by East and Bain, namely, "Recent Advances in Cardiology."[1] That this book requires a second edition in such a short time speaks for itself and shows that it has filled a want.

The book is full of good things. There are a few little inaccuracies in it, but these are of no importance. It covers an enormous amount of ground and literature. It is a great pity that the recent anatomical investigations made about the heart are not published in the book, as these would explain many of the difficulties in the understanding of the recent work in cardiology.

The treatment in the book is excellent, and we are only too glad to see an excellent *résumé* of the telerontegraphic and orthodioscopic work that has been done in France and Germany. So far as we know, the only work in the English language on this subject is that of Vasquez. The section on electrocardiography is quite up to date and is all that is necessary for a refresher for the larger text books. A little might have been said about the action of certain drugs on the coronary circulation. This the authors have evidently missed. Except for these few shortcomings this book can be thoroughly recommended to any physician who desires to find most of the new work discussed in a reasonable compass.

"THE SYDNEY MORNING HERALD" AND AUSTRALIAN HISTORY.

THE month of April, 1831, saw the birth of *The Sydney Herald*. The original proprietors were three young men, Ward Stephens, Frederick Michael Stokes and William McGarvie. At this time Sydney was small, and with the exception of Van Diemen's Land, afterwards called Tasmania, none of the colonies had been separated from New South Wales. In its third issue—the paper was originally published every week—the proprietors informed the public that they had seven hundred and fifty subscribers, "considerably more than any other Sydney journal." Since that time the paper has grown steadily in importance and influence. In February, 1841, the paper was bought by Charles Kemp and John Fairfax. In the following year the full title, *The Sydney Morning Herald*, was adopted. To mark the one hundredth anniversary of its birth the present proprietors, John Fairfax and Sons, Limited, have issued a memorable volume, "A Century of Journalism."[2]

The book serves a threefold purpose. It is a testimony to the high ideals of the family of Fairfax; it is a monument to the labour and devotion of the journalists who through a long succession of years have translated those ideals into action; it is a record of Australian achievement, of the building of Australian character and of the development of Australia as a nation—in short, it is a record of Australian history.

Of the family of Fairfax much need not be written in this place. In 1853 John Fairfax took over his partner's share in the paper, and it has since then remained a Fairfax possession. The editorial chair has had five occupants. The Reverend John West was first editor, and he was followed by Dr. Andrew Garran (a doctor of laws), William Curnow, Thomas Heney and the present editor, Mr. C. Brunsdon Fletcher. It would be difficult to estimate the influence of these men on Australian journalism. The high standard set by *The Sydney Morning Herald* has been consistently maintained. These aspects of the book may not perhaps appeal particularly to medical practitioners;

[1] "Recent Advances in Cardiology," by C. F. Terence East, M.A., M.D., F.R.C.P., and C. W. Curtis Bain, M.C., M.B., M.R.C.P.; Second Edition; 1931. London: J. and A. Churchill; Australia: Angus and Robertson. Demy 8vo., pp. 363 with 10 plates and 62 text-figures.

[2] "A Century of Journalism: The Sydney Morning Herald and its Record of Australian Life, 1831-1931"; 1931. Sydney: John Fairfax and Sons, Limited; Angus and Robertson, Limited. Demy 4to., pp. 805, with illustrations. Price: 35s.

the third, or historical, aspect will chiefly arouse their interest.

From the historical point of view the book is most fascinating. The subtitle is: "The Sydney Morning Herald and its Record of Australian Life." Little more need be said. It is obvious that the Australian records of the last hundred years available to the compilers of the book must have been complete. The compilers, Mr. P. S. Allen and Mr. S. Elliott Napier, have done their work well and are deserving of the highest praise. It is a little difficult to single out particular subjects for reference, but perhaps most interest will be found to centre around the records of William Charles Wentworth and his great work. The story of the coming of Federation also cannot fail to hold the interest even of those who merely dip into the pages of the book. A special reference must be made to the illustrations. They are numerous and appropriate, particularly those depicting scenes and events in the early days.

Readers of THE MEDICAL JOURNAL OF AUSTRALIA are advised at any rate to see this book. If they do this they will surely order a copy. We cannot imagine any Australian with an interest in the history of his country and with any love of books who would not wish to have a copy in his possession.

A TEXT BOOK OF SURGERY.

THE fact that "Ashhurst's Surgery: Its Principles and Practice" has reached to a fourth edition in seventeen years is evidence that there is some demand of a continuous kind for a work of this character.[1] In his position of Professor of Clinical Surgery in the University of Pennsylvania the author has opportunities of expressing views that are in keeping with his status, influenced by a knowledge of the modern development of surgery and by a lengthy experience as a teaching surgeon. To those who live outside the United States of America the value of the book is minimized by the necessity of reference to the "Index Medicus" or to the "Index Catalogue of the Surgeon-General's Library, United States Army." In the absence of these books we feel that a detailed list of bibliographical references at the end of the book or of each chapter would greatly enhance its practical value and help to dispel the thought that many important subjects have received scanty consideration. True it is that the author has purposely eliminated consideration of the special diseases of the eye, ear, nose and throat, but should he not have extended to these specialties the same courtesy that is extended to genito-urinary surgery, gynæcology and orthopædics "so far as they come within the province of the general surgeon"? The space devoted to illustrations, such as those of a papilloma of the face, of multiple sebaceous cysts, of scars of incisions for cellulitis *et cetera*, might well have been devoted to some more useful purpose.

The various chapters of the book are arranged on the usual lines, beginning with those on inflammation, tumours, injury and surgical technique and followed by those on injuries and diseases of numerous organs or systems.

It is impossible in the space at our disposal to comment on the numerous details that crowd the pages. The author firmly states his own views and the results of his own practical experience. In addition he quotes the opinions and results of other eminent surgeons who have adopted certain lines of treatment. His attitude is on the whole conservative. Many practical details are well and briefly emphasized. Some are altogether too brief. In a case of hare-lip "the principle of the operation consists in freshening the edges of the fissure and suturing them together." In a case of diverticulum of the bladder "the only satisfactory treatment is excision of the diverticulum." There are many examples such as these that leave a great deal unsaid. From the general practitioner's point of view the omission of the operation of tonsillectomy and of the removal of adenoids seems difficult to explain. In surgical technique he weighs the arguments for and against "aseptic" and "antiseptic" methods, prefers picric spirit to iodine in skin preparation as less irritating, and is in no great haste to remove ordinary sutures.

The operative treatment of fractures is well considered with warning against unnecessary operation. He favours plating in recent cases and *cerclage* with wire or Parham's band in certain oblique fractures. In fractures of the cervical spine Langworthy's method of reduction is recommended, and not longitudinal traction. The surgical treatment of the paraplegia of Pott's disease in adults is advised if there is no improvement after recumbency for three or four months.

The difficult problem of such diseases as those of Perthes, Schlatter and Köhler is not solved by placing them amongst the "osteochondritides," although streptococci have been found in a number of such lesions.

Cutler's method of transillumination in diseases of the breast is approved.

In cerebral surgery the Bovie apparatus has been satisfactorily employed in the removal of tumours. In all cases of brain injury the use of lumbar puncture is emphasized and the indications for hydration and dehydration discussed.

The experience of the author in the injection treatment of varicose veins and hæmorrhoids is evidently too limited for him to pronounce a definite opinion.

In the articles on peritonitis and appendicitis the author lets himself go more freely, counters the opinion of Deaver concerning the site of incision in the presence of abscess, and favours opening of the peritoneum first, except in advanced cases. He makes a transverse incision.

Ulcers of the stomach or duodenum at the pylorus are dealt with by the Finney operation, if there are no or few adhesions. Otherwise gastro-jejunostomy is employed. For gastric ulcer elsewhere excision of the ulcer or partial gastrectomy is performed. No reference is made to the anæmia following partial removal of the stomach.

A brief chapter on gynæcology concludes the scientific part of the volume. The illustrations of clinical cases are very good, but many of the reproductions of X ray photographs are indistinct. In our opinion the book is more valuable to the practitioner than to the student. In spite of the wealth of detail compressed into the relatively small space of 1150 pages, it is an easy book to read and worthy of a place on the surgeon's book shelf.

[1] "Surgery: Its Principles and Practice for Students and Practitioners," by A. P. C. Ashhurst, A.B., M.D., F.A.C.S.; Fourth Edition, thoroughly revised; 1931. Philadelphia: Lea and Febiger. Royal 8vo., pp. 1200, with 15 coloured plates and 1063 illustrations. Price: $10.00 net.

A BOOK FOR MOTHERS.

"HAPPY MOTHERHOOD" is an excellent book by a London nurse, Peggie W. Yeomans.[1] She gives mothers practical advice in an attractive form on how to rear their children. The subject matter is well arranged and the language clear, but at times Mrs. Yeomans is rather sentimental and uses unnecessary slang. Her remarks on the medical aspect of her subject are as a rule correct, but a statement such as "the boy baby uses more of your vigour than the girl" is not in accordance with scientific fact.

Her general advice as to the mother's preparation for her confinement is sound, but she is rather too cheerful. Few women feel "a desire for activity" as their hour draws near, and fewer still feel "full of beans" immediately afterwards.

Her directions as to the management of the feeding of infants are excellent, and the chapter on nursery routine and discipline shows a rare understanding of child character.

The chapters on nursery food with specimen menus are clear, though surely it is a printer's error when the yolk of an egg is used for making albumen water. Nursery first aid and sick nursing are dealt with thoroughly. The patent foods and medicines mentioned are better known in England than in Australia.

A practitioner will find this a most valuable book to recommend to his patients, and it could be studied with advantage by all medical students. Indeed, most doctors would profit by reading it themselves.

[1] "Happy Motherhood," by P. W. Yeomans; 1931. London: William Heinemann (Medical Books) Limited. Crown 8vo., pp. 167. Price: 3s. 6d. net.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 12, 1931.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: Initials of author, surname of author, full title of article, name of journal, volume, full date (month, day and year), number of the first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction, are invited to seek the advice of the Editor.

CUSTOMS CHARGES ON BOOKS.

Most people who give any thought to the financial affairs of the moment, will agree that national expenditure must be kept within reasonable bounds and that provision must be made for essential services by some form of taxation. Most difference of opinion will arise in regard to the incidence of taxation. It is not the province of this journal to discuss the fiscal problems of the Commonwealth nor to suggest ways and means of "balancing budgets." At the same time the members of the medical profession are affected directly and indirectly in many ways. They have, of course, to bear their share of the common burden and have no occasion to complain until some enactment or regulation acts or threatens to act in a way that is prejudicial either to the pursuit of scientific knowledge or the treatment of sick people.

During recent months students of medicine and of the allied sciences, as well as students of literature, have found that the cost of books imported from overseas has been mounting higher and higher. There is no duty on books, payable as such, but when the primage charges made by the Commonwealth Government are added to the cost of postage, and when the high rates of exchange are paid, the cost of books becomes almost prohibitive. Primage charges may not be technically the same as duty payable, but as far as the student is concerned, the effect is the same—the cost mounts higher. It is time that a voice or voices were raised in protest, for a government that will make primage charges for books will not hesitate, in its frantic search for taxable commodities, to impose a duty on books.

Customs duties are imposed for the protection of the industries of a country. Boots and shoes, for example, can be made in Australia, and duty is imposed on boots and shoes from other countries for the purpose of furthering the Australian industry. The population of Australia is large and must be adequately shod. Text books on scientific subjects and standard literary works might be written, printed and published in Australia, but the section of the people requiring them is so small that the Australian effort would more often than not be doomed to failure. When a text book is published in Australia as the prescribed book for certain courses of study, the matter is different and the venture may be made to pay. Further, scientific books cannot be written to order. The majority of scientific workers live in other parts of the world and many of those best qualified to teach by the written word are not in Australia. Apart from these considerations it must be recognized that a duty on books is a tax on knowledge, and nothing in the world of taxation could be more reprehensible. The objection may be raised that when many books are bought, much money leaves the country. This is true, but the knowledge gained from a study of these books will be used in the conservation of the health of the people, in the building up of industry and in the acquisition of what, for want of a better word, may be termed culture—a healthy psychological outlook, an appreciation of literary value and an ability to think. Incidentally it may be pointed out that the Commonwealth has a power of censorship and can exclude all that may appear to the all-discerning eye of the censors likely to be harmful to the minds of impressionable Australians. (The wisdom or lack of wisdom of public censorship of books opens up possibilities of discussion which must be resisted for the moment.)

The end of the matter is that the primage charges on books brought into the Commonwealth should be abandoned. In making this statement we do not intend it to be applied to all kinds of literature. An example in the other direction may be quoted. The Council of Associated Arts is initiating a movement to prevent the dumping into Australia of cheap magazines from other countries. The institute points out that magazines are produced in Australia and that the dumping of magazines from other countries is a handicap to Australian writers. The plea is reasonable and should be considered, for there is a large body of the public demanding reading matter of this kind. The books with which we are concerned have been described. Our object in discussing this matter is to create a public opinion to oppose charges that are unreasonable and therefore unjustified. Scientific and literary workers are not wealthy. If books become too expensive, they will not be bought, the main avenue of knowledge will be closed and Australia as a whole will be the loser.

Current Comment.

SCARLET FEVER.

MANY of the problems connected with scarlet fever are by no means yet conclusively solved. Why is scarlet fever prevalent in some areas and almost or quite absent from others? Why does scarlet fever not spread when introduced into the tropics? In the Dutch East Indies the majority of children give positive reactions to the Dick test, yet scarlet fever does not occur. In these regions, with increasing age of the children the number who do not react to the Dick test approximates to the number observed where scarlet fever is endemic. The specificity of the Dick reaction has been disputed by some, who consider it a manifestation of allergy and not an indication of immunity or susceptibility to scarlet fever. In the first months of life the reaction is usually absent. Roumanian writers contest the value of the Dick test, asserting that the causal organism of scarlet fever is not a hæmolytic streptococcus. The observations of Ruth Tunnicliff would seem to indicate that the streptococci from scarlet fever, erysipelas and septic sore throat are distinct organisms yielding different growths. The experiments of G. F. and G. H. Dick with soluble toxins produced by scarlet fever and erysipelas hæmolytic streptococci showed *inter alia* that an attack of scarlet fever does not confer immunity to erysipelas and that the soluble toxins produced by the hæmolytic streptococci of erysipelas and scarlet fever are immunologically and specifically distinct. Another problem is how far one attack of scarlet fever produces immunity against subsequent attacks. The case recorded by W. H. Kelleher, of a patient having five definite attacks of scarlet fever between the ages of thirteen and twenty-eight years, is not easily explained.

T. Toyoda, J. Moriwaki, Y. Futagi and C. Kuroi, of Manchuria, have given a most useful account of experimental research into the problems of scarlet fever.[1] Owing to the fact that the *Streptococcus scarlatinæ* apparently has no specific differences from other types, some observers have looked for some activator other than this streptococcus, possibly a filtrable body. Scarlet fever can be artificially produced by the streptococcus, but not all streptococci can produce scarlet fever. Investigations concerning the power of hæmolytic streptococci derived from different sources to produce the toxin and cause the scarlatinal rash demonstrated that the degree of ability varied greatly and that not all streptococci possessed it. The authors considered that the erysipelas streptococcus, if highly virulent and capable of producing the Dick toxin, could probably cause scarlet fever in a very susceptible subject. Immunity conferred by an attack of scarlet fever is stated to be permanent; but the immunity following other streptococcal diseases is not permanent. Immunity from scarlet fever is an antitoxic immunity resulting from a general reaction to the scarlatinal streptococcus toxin which has spread over the whole body; so the antitoxin produced can neutralize the streptococcus toxin and accordingly no rash originating from the toxin can be produced. But those who have been infected with any other streptococcal disorder, such as scarlatina without exanthema, angina or erysipelas are liable to further infection in the form of localized disease, caused by the streptococcus or its toxin, despite the presence of the antitoxin. There is no rash in such streptococcal diseases as puerperal fever or phlegmon or in diphtheria with superadded streptococcal invasion. It cannot be said that non-scarlatinal streptococci invariably produce Dick toxin, but even if they have such power, the extent of their ability is not, of necessity, similar to that of the scarlatinal streptococcus, and suitable conditions are required for the streptococcus with a high degree of ability to produce the Dick toxin. The chief reason that no rash occurs in the disorders mentioned is dependent on the resistance of the body or the degree of its susceptibility, that is, the power of the patient's serum to neutralize the toxin. In a highly susceptible person non-scarlatinal hæmolytic streptococci may cause the rash if they have enough power to produce the toxin and are under suitable conditions for the production of the toxin, as in puerperal scarlet fever. In a few instances of surgical scarlet fever hæmolytic staphylococci only, and not streptococci, are found. But in these cases the attendant rash is

[1] *American Journal of Diseases of Children*, May, 1931.

clinically different from that of scarlet fever, and injection of streptococcus antitoxin in the area of the rash does not produce blanching. In the light of the Schultz-Charlton phenomenon and the Dick reaction the rash produced by the staphylococcus toxin is distinct from the scarlatinal rash. The hæmolytic *Streptococcus scarlatinæ* can be isolated from 100% of cases of ordinary scarlet fever, but the percentage varies with the method employed to obtain swab cultures. Streptococci may not be detected on one side of the tonsil while they are abundant on the other side. Care must be taken in collecting material from throats and in cultivating it by the pouring method. Simply to apply the throat swab to the blood agar plate will give a much lower percentage of positive results. The greatest incidence of scarlet fever is between the ages of three and eight years, gradually diminishing with increasing age. Other streptococcal disorders do not display this age feature. The early manifestations of scarlet fever (vomiting, pyrexia and rash) are generally caused by the absorption of the toxin, not by the streptococcus itself, and individuals possessing, in the blood, antitoxin capable of neutralizing the toxin (chiefly adults) may develop no rash, but may have scarlatina without exanthema. Ordinary scarlet fever with rash may occur in infants, children and some adults—those with a strongly positive Dick reaction, whose serum will produce the "negative" Schultz-Charlton phenomenon. Localized changes observed in angina, phlegmon, erysipelas and other streptococcal disorders may be caused by the streptococcus itself or its toxin, in spite of the presence of antitoxin. Scarlatinal hæmolytic streptococci are those strains of hæmolytic streptococci which possess a stronger tendency to produce a rash in the human subject and also stronger antigens for the blanching phenomenon. Dick toxin (the streptococcus culture filtrate) consists of heat-labile exotoxin and heat-stable endotoxin. The former contains no nitrogen. The symptoms of scarlet fever in the early stage are caused by this exotoxin, and the cutaneous reaction to this toxin is pronounced in those not immunized against streptococcus toxin or scarlet fever. Allergic reaction is never produced. Heat-stable endotoxin is not destroyed by a temperature of 100° C. for two hours. Allergic reaction often follows the use of this toxin in those immunized against scarlet fever or streptococci. The toxin employed for the Dick test should be pure heat-labile exotoxin and the cutaneous reaction accurately indicates the susceptibility of each subject to scarlet fever. In prophylactic immunization by Dick toxin, to reduce the reaction it is best to use streptococcus anatoxin (toxoid) prepared by Ramon's method, and not Dick's raw toxin. The greater the heat to which the toxin is exposed and the longer the duration of heating, the greater is the decrease in the reactions induced by the anatoxin; but also the greater is the diminution of antigenic power. The best material producing comparatively slight reactions, but retaining sufficient antigenic power, is the anatoxin prepared by heating Dick's raw toxin with a 0·5% solution of formaldehyde heated to 40° C. for sixty days, or 45° C. for thirty days. The toxin of non-scarlatinal hæmolytic streptococci can be neutralized by scarlet fever convalescent serum, though less constantly. Immunization with non-scarlatinal hæmolytic streptococci can give rise to the blanching phenomenon. Antitoxic serums against erysipelas hæmolytic streptococci exert similar effects on scarlet fever. An area of human skin previously treated with toxin of non-scarlatinal hæmolytic streptococci can exert a local allergic or immunity reaction when the person later contracts scarlet fever, as is also the case in an area treated with a toxin of scarlatinal strain. Injections of toxins of non-scarlatinal hæmolytic streptococci can change a response to the Dick test into a failure to react. The rash caused by a toxin of hæmolytic streptococci of scarlatinal origin is identical with that caused by a non-scarlatinal streptococcus.

These observations are all of extreme importance, but while Toyoda and his colleagues obviously consider the immunity following an attack of scarlet fever to be permanent, such is certainly not the case.

SIALOGRAPHY.

IN 1925 Bársony demonstrated dilatation of the parotid duct by injecting into its lumen a solution of potassium iodide and taking a skiagram of the area. A good deal of pain was caused by the solution. Since then lipiodol has been used. Reginald T. Payne has given a description of sialography, with an account of four cases in which useful information was obtained by this means.[1] In his four cases the ducts of the parotid gland were injected; he points out there is only one record, and that a scanty one, of the process having been applied to the submaxillary duct. In Payne's first case the injection revealed a parotid fistula that was strictly glandular in type; in the second a pathological dilatation of the smaller ducts was shown following recurrent subacute parotitis; in the third dilatation was revealed in association with a calculus; in the fourth case, one of Mikulicz's disease, the ducts were shown to be normal. The procedure calls for care and gentleness; it is painless. The lipiodol is injected with a fountain pen bulb attached to a piece of glass tubing, the end of which has been drawn out to a fine point one millimetre in diameter. Payne's report is important, and though his cases are so few, he is apparently justified in his statement that the procedure is safe and simple. One of his conclusions may be quoted with advantage: "By means of its application the normality or otherwise of the parotid duct and its branches can be demonstrated, and in pathological conditions affecting the gland the information so gained may render diagnosis more exact, and consequent treatment more rational." Not the least interesting part of Payne's article is his skiagrams, which are excellently reproduced.

[1] *The British Journal of Surgery*, July, 1931.

Abstracts from Current Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Agglutination Test in Brucella Abortus Infections.

B. S. HENRY AND J. TRAUM (*Journal of Infectious Diseases*, November, 1930) report results of comparative studies on several phases of the agglutination test for *Brucella abortus* infection. These studies were undertaken in an attempt to establish a definite procedure in major particulars of the test, so that various laboratory workers might be able to evaluate the results in terms of their several test values. It was found that in various laboratories there were differences in the making of the serum-agglutination dilutions, in the preparation and preservation of their antigens, and in the length of time and the temperature at which the test tubes are under observation after antigen and serum have been mixed. It was found that the various methods of obtaining serum-antigen dilutions had practically no influence on the results. Formalinized antigens were found to have a tendency to intensify or to cause pro-agglutination with human, bovine and porcine sera to such an extent that occasionally strongly positive sera might be missed. In the same sera, tested with phenolized or tricresolized antigen, the interference is absent or reduced to such a point as to be negligible. Readings should be taken after incubation overnight at 37° C. followed by twenty-four hours at room temperature. Variations in the opacity of the antigen within fairly wide limits have no great influence on the correct interpretation of the results.

Antipoliomyelitic Horse Serum.

ELLIOTT R. WEYER, WILLIAM H. PARK AND E. J. BANZHAF (*Journal of Experimental Medicine*, April, 1931) report the successful production of potent virus-neutralizing preparations drawn from immunized horses. The authors have found it satisfactory to inject horses with virulent cord emulsion (10%) in doses increasing from one to fifty cubic centimetres. The inoculations are given subcutaneously or intradermally and are administered on four successive days in each week. That certain horses fail to respond has been demonstrated. It has also been found that horses having no measurable native antibody may readily become producers of a high titre serum. Indeed, in no horse has there yet been found evidence of a specific antibody prior to the immunization treatments. After two months of injections horses which will satisfactorily respond to the immunization, will have produced sufficient antibody to neutralize the active virus of poliomyelitis. Evidence of worth is determined by means of an *in vitro* neutralization test, the technique of which is as follows. Virus emulsions, 5%, are prepared by grinding virulent monkey spinal cord with saline solution. The serum to be tested is added in the desired proportion and after an hour's incubation at room temperature the mixtures are introduced of the cerebral hemispheres of susceptible monkeys. The amount of inoculum is so calculated that it represents at least two infective doses. The potency of the virus has apparently no effect upon the amount of a specified serum preparation needed to neutralize it. When using particularly potent strains of virus the inoculum often contains as many as several hundred killing doses of virus. The virucidal potency of serum from immunized horses can be raised to a point comparable to that of human convalescent serum and, when concentrated and refined, exhibits a fourfold increase in potency. Such concentrates have proved effective in the prevention of paralysis in inoculated monkeys when given intraspinously before the onset of paralysis. Treatment has been found more effective when therapeutic serum is given through the spinal route. Pooled serum from "normal" adult donors has proved effective in neutralizing virus, but its potency is approximately one-half that of convalescent serum.

Precipitation with Cerebro-Spinal Fluids.

A. M. MALLOY, R. L. KAHN AND LUCY WESTALL (*The Journal of Infectious Diseases*, February, 1931) report the result of a study of the relationship between the three precipitation reactions employed for diagnostic purposes in the examination of cerebro-spinal fluid—the colloidal gold reaction, the mastic reaction and Kahn's flocculation test. The protein fractions of spinal fluid were obtained by means of ammonium sulphate—half saturation for the globulin fraction and complete saturation for the albumin fraction. Details of the technique employed are given. It was noted that the globulin fraction of cerebro-spinal fluid gave considerably more definite reactions than the original fluid with the colloidal gold and mastic tests, and that the albumin fraction gave consistently negative results. It was also noted that if the albumin fraction of cerebro-spinal fluid was added to the globulin fraction and the colloidal gold and mastic tests were performed on the resulting mixture, the results are not the same as those given by the globulin fraction or by the original cerebro-spinal fluid. The globulin fraction and the albumin-globulin mixture were more sensitive than the original fluid. It was also noted that after a Kahn test had been performed with a solution of globulin obtained from cerebro-spinal fluid and after removal of the precipitate by centrifugalization, the supernatant fluid continued to give colloidal gold and mastic reactions, indicating that the precipitin substances in the globulin solution (or the conditions of this solution) responsible for the Kahn reaction are not the same as those responsible for the results of the colloidal gold and mastic tests. Heating the globulin fraction at 56° C. up to two hours exerts little effect on the three reactions. When heating is prolonged to twenty-four hours, there is a tendency towards reduction in sensitivity, especially in that of Kahn's reaction. Heating the globulin fraction at temperatures higher than 56° C. exerts comparatively little reduction in the sensitiveness of the colloidal gold and mastic reactions and considerable reduction in that of Kahn's reaction. These heating experiments also indicate that the conditions governing the Kahn reaction are not identical with those governing the colloidal gold and mastic reactions.

The Cultivation of Tubercle Bacilli.

RUSSELL D. HERROLD (*Journal of Infectious Diseases*, February, 1931) recommends the following medium for successful cultivation of tubercle bacilli. Beef extract is prepared by the following formula: Liebig's beef extract, 3 grammes; peptone, 10 grammes; sodium chloride, 5 grammes; agar, 10 grammes; distilled water, 1,000 cubic centimetres. The mixture is adjusted to a pH of approximately 7·5. The yolk of one egg is added to 150 cubic centimetres of melted agar at a temperature of 60° C. This is approximately 15% of egg yolk. The agar is allowed to cool to about 40° C. and about 25 cubic centimetres are poured into each Petri plate. A simple method of adding egg yolk is to flame one end of the egg and crack it with sterile forceps, so that a small opening is made in the shell for discarding the white, after which the yolk is broken with a sterile platinum loop to permit its flow into the container of melted agar. The egg may be immersed in phenol and then alcohol before flaming, or it may be placed in boiling water for one minute after preliminary flaming. The incubator should be kept moist to prevent drying of the plates, although it has been noticed that the yolk agar plates do not dry as quickly as blood agar plates. Closed containers may be used when the incubator is not sufficiently moist, or the plates may be wrapped in tinfoil. The medium can be used for both plates and slopes. Comparative tests show that the use of this medium is more certain than the examination of smears for the presence of tubercle bacilli, and it is as delicate as, but much more prompt than, the inoculation of guinea-pigs. A moist atmosphere and incubation at a temperature between 34° and 36° C. are essential for successful results.

The Ætiology of the Common Cold.

P. H. LONG, J. A. DOULL, J. M. BOURN AND E. MCCOMB (*Journal of Experimental Medicine*, April, 1931) relate the result of an investigation into the ætiology of the common cold. Their observations support the conclusions of Dochez and his associates that the contagious cold is caused by a filtrable agent which probably belongs to the group of so-called fil-

trable viruses. Human volunteers were used and strictness of quarantine and the selection of a season of the year when colds are not prevalent, were considered of great importance in the investigation. The inoculum was obtained from carefully selected subjects with natural colds by washing out the naso-pharyngeal passages with yeast infusion broth. Seitz and Berkefeld W filters were used in obtaining filtrates. The studies of the aerobic bacterial flora in the naso-pharynx showed no striking differences between the control period and the period of upper respiratory infection. Certain volunteers did not harbour any organisms under observation, while others were consistent carriers during the period of investigation. It was concluded that the particular aerobic bacteria studied played no part in the production of upper respiratory infection. Nineteen individuals acted as subjects and twenty inoculations were performed. Eleven out of the twenty inoculations resulted in upper respiratory infection. The incubation period in the infected individuals varied from twenty to seventy hours.

HYGIENE.

The Industrial Medical Officer and His Work.

H. G. P. CASTELLAIN (*Journal of State Medicine*, November, 1930), in a paper read at the Portsmouth Congress, comments on the varying views of doctors and managers on the proper function of the industrial medical officer. After pointing out that the true function of the industrial medical officer is not primarily to treat individuals but to insure good working conditions and proper selection of occupations, the author stresses the need for proper medical training in this direction. The range of special knowledge required, including the subjects of the diploma of public health course and welfare matters, is stated. Preliminary examination of new employees is necessary and records should be kept. All aspects of plant hygiene require special knowledge and experience.

The Study of Industrial Diseases.

E. G. BOWEN (*Journal of State Medicine*, November, 1930) has attempted to show how geographical and racial factors affect the course of miner's phthisis. An anthropological survey of two adjacent valley regions in Cardiganshire has revealed the existence of two separate types of inhabitant, one type inhabiting each of the areas surveyed. The two valleys present different geographical features, one, inhabited by dark, long-headed folk of slender build, being narrow and gorge-like; the other valley is wider and peopled by a larger, fair-haired type of individual. Lead and zinc mining has been carried out in these valleys for many centuries and has now declined, leaving the inhabitants to take up farming. Sheep farming is practicable only in the narrow valley, but crops are grown in the more fertile one. Examination of the death registers in the area from 1879 to 1926 shows the incidence of miner's phthisis to be high. The mines were badly ventilated and very wet, and complication of silicosis by tuberculosis was almost universal. It was found that in the narrow region 37% of the deaths took place between the ages of 57 and 62, and only 8% between the ages of 65 and 70, as against 22% and 20% respectively in the wider, more fertile area. Most deaths from miner's phthisis took place when the mining activities were declining. The incidence of simple pulmonary tuberculosis follows the same variations in the period under review as miner's phthisis. The better class of living, more sunshine and other social and economical factors in the second valley have resulted in increased resistance to pulmonary tuberculosis in the older mining population as well as the present agricultural population.

Industrial Dermatitis and the Organism of Dandruff.

W. KENNETH WILLS (*Journal of State Medicine*, November, 1930) points out that any cause of scratching, if dandruff is present, may lead to inoculation by the fingers with a resulting seborrhœic eczema. In many cases of intractable trade dermatitis it is found that the lesion is typical follicular seborrhœic dermatitis. In these circumstances it is found that the scalps are infected by dandruff. Reinfection from the patient's scalp often causes delay in healing.

The Prevention of Street Accidents.

J. A. A. PICKARD (*Journal of State Medicine*, February, 1931) the General Secretary of the National "Safety First" Association comments on the relatively small proportion of all accidents which are reported in the Press. In England and Wales at the present time the daily average of road accidents is 18 killed and 500 injured. The rate of increase is almost identical with the increase in the number of motor vehicles, although the annual percentage increase since the National "Safety First" Campaign was started has been smaller. The age incidence curve for death rate from accident shows peaks for the age groups five to ten and twenty to twenty-five years, and over sixty-five years the incidence rises sharply. One half the victims of street accidents are pedestrians, one-eighth pedal cyclists, one-quarter motor cyclists or their passengers, and the remainder motor drivers or their passengers. Every year one person is killed for every four hundred motor vehicles on the road, and one injured for every eighteen motor vehicles on the road. Of motor accidents 87% occur in daylight hours and 68% in populous places; 77% occur when there is little traffic on the road, and 68% on straight roads. Of the prime causes of accident, human failure is responsible for 85%. Improvement of road surfaces and of vision at corners and junctions, and the adoption of automatic traffic signals, one-way traffic, safety zones for pedestrians, all help in reducing mortality. A decrease in the number of accidents has followed abolition of the speed limit in many places. Road patrols are useful. In Edinburgh there has been a progressive decrease in street accidents, which is attributed to educational campaign measures. All drivers should be made to pass a physical and a psychological examination as well as to satisfy the authorities that they have a thorough knowledge of the rule of the road. The great majority of accidents may be avoided by care and thought on the part of the people concerned.

The Prevention of Tuberculosis.

S. L. CUMMINS (*Journal of State Medicine*, February, 1931), in a lecture delivered at the Institute of Public Health, points out that a large proportion of the cases of tuberculosis recognized in England and Wales arises in persons with a history of contact with infection, in many cases at home. When contact cannot be proved, it may be assumed that the negative finding is due to deficient records. Infection probably takes place during childhood and adolescence. In the prevention of tuberculosis, apart from bovine infections, efforts should be directed towards infected families, first, by removal of infected persons from their homes, secondly, by removal of susceptible persons from infected homes, and, thirdly, by protection of those exposed to home infection from the risk of developing tuberculosis. The first measure is not completely successful, owing to popular objection to compulsory segregation. The second measure presents difficulties from various points of view and does not appear to have made progress under the Grancher system in France. Special organization for tuberculous child contacts is needed, and care should be taken to provide the organization with a name free from the suggestion of tuberculosis. Temporary or permanent segregation may be undertaken. Temporary segregation applies even more to the third measure, the protection of those exposed to home infection. Typical examples of the need for this measure are the apical infections so often seen in young females in Wales, who come under review only when febrile. If such patients were under observation as adolescents in the afebrile state, many infections could be prevented from developing. For such contacts provision should be made for extra nourishment, shelters, examination of contacts at half-yearly intervals, tuberculin tests and careful instruction of parents and children. About 4% of deaths from tuberculosis are due to the bovine bacillus. The pasteurization of milk will prevent this as well as the incidence of infections in which recovery occurs after long suffering.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE VICTORIAN BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at Wangaratta on May 2, 1931, DR. VICTOR HURLEY, the President, in the chair.

Urological Surgery.

DR. H. MORTENSEN read a paper entitled: "Modern Methods in Urological Surgery" (see page 313).

DR. H. FLECKER said that, in collaboration with Dr. Jona, he had investigated the action on the renal pelvis and ureters of drugs injected from below. Lipiodol soon escaped into the bladder and was lost sight of quickly when compared with the appearance of pyelograms after the intravenous injection of "Uroselectan." With "Uroselectan" the shadows in the pelvis of the kidney and in the bladder were quite dense for a period up to three or four hours. The cause for the rapid evacuation of lipiodol apparently was its injection under pressure.

DR. VICTOR HURLEY thanked Dr. Mortensen for his paper and said that he agreed that it was important to make an accurate diagnosis of the nature of prostatic enlargement. There were a certain number of cases of prostatic enlargement in which the enlargement was not progressive and in which the symptoms improved after the age of fifty to sixty years and were followed by recovery and return to comfort.

He agreed that the symptoms of prostatic malignant disease might be extremely obscure and widespread metastases might occur before a diagnosis was made. Prostatic disease with enlargement might occur without any symptoms referable to the prostate, and such patients might present themselves with symptoms suggestive of abdominal malignant disease. In the treatment of prostatic malignant disease deep X ray therapy and radium therapy seemed to do little good and might make the condition worse.

The best advice to such patients was to continue for as long as possible without interference and then to use a self-retaining catheter. The reported improvement in Thompson Walker's figures for mortality following his open operation probably depended on his increased judgement in selecting patients for operation as well as on improved technique.

Referring to Harris's operation for prostatectomy Dr. Hurley said that this was a most satisfactory operation, but for the present it seemed that both the instruments and the technique were for Harris only.

Renal colic without radiographic evidence of calculus was not uncommon, as at least 50% of such cases showed nothing abnormal on X ray examination. In some cases the cause might be gravel and true stone formation might occur later.

In tuberculous infection of the kidney tubercle bacilli could nearly always be found if the search for them was sufficiently diligent. On the other hand cases had occurred in which tubercle bacilli had been found in the urine with other signs suggesting renal tuberculosis, and on removal of the kidney and ureter no sign of tuberculosis had been found on macroscopical or microscopical examination. In view of such occurrences it was accepted by many observers that the kidney could excrete tubercle bacilli which had their source in a tuberculous focus elsewhere in the body.

In reply Dr. Mortensen said that the use of "Uroselectan" opened up a new field of diagnosis, as in renal colic frequently no calculus was shown when an ascending pyelogram was used, whereas it was well shown on using "Uroselectan." The question as to whether a normal kidney could excrete tubercle bacilli was the subject of age-old discussion, and the opinions of competent authorities still differed on the point.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Royal North Shore Hospital of Sydney on June 11, 1931. The meeting took the form of a clinical demonstration by the members of the honorary staff.

Diabetes Mellitus and Pulmonary Tuberculosis.

DR. COTTER HARVEY showed a male patient, a hawker, aged sixty-two years, who was admitted to hospital on March 22, 1931, complaining of cough of four months' duration. The patient had suffered from diabetes for the past nineteen years and had been treated "on and off." He was an in-patient at the Royal Prince Alfred Hospital in 1918 with diabetic coma. For four months before admission to the Royal North Shore Hospital he suffered from severe cough, with copious sputum and night sweats. During this period he lost 15·8 kilograms (two stone and a half) in weight. On admission he was a large man of a good colour, weighing 81 kilograms (twelve stone twelve pounds). His temperature was normal and his pulse rate 100 in the minute. Signs of extensive tuberculous disease were present in the right lung. The urine contained much sugar and acetone. The sputum contained numerous tubercle bacilli. X ray examination revealed advanced tuberculosis of the right lung, with cavitation and pleural thickening in the apex and infraclavicular region. An early lesion was situated just above the left hilum. The sugar tolerance curve rose to 0·36% in half an hour, the fasting blood sugar content being 0·29%.

The treatment of the diabetic condition consisted first of all in raising the diet from 1,700 to 2,000 calories in seven days. The insulin dosage was raised from 18 to 36 units and the urine became free of sugar and acetone. One week later the diet was raised to 3,000 calories. A trace of sugar and acetone was then found persistently, though the patient's weight increased to 82 kilograms (thirteen stone two pounds). The diet was reduced to one of 2,600 calories, and the sugar and acetone disappeared. Insulin was reduced to 30 units a day. The patient was then given Lawrence's line-ration diet, fourteen rations a day (2,660 calories). The patient's urine remained sugar-free and the blood sugar estimation gave a figure of 0·15%. The patient was allowed to go home, taking 30 units of insulin a day.

Treatment for the pulmonary condition consisted first of all in the production of an artificial pneumothorax on the right side, and this was maintained. Good collapse of the upper lobe was obtained, but less collapse of the lower where the disease was less apparent. The clinical result was excellent. There was no evidence of spread in the opposite lung. The patient remained afebrile throughout.

Dr. Harvey drew attention to the interaction of the treatment. He said that the high diet and the insulin would combat the loss of weight and be beneficial to the tuberculosis, and the artificial pneumothorax would combat any septic focus in the lung and be beneficial to the diabetes as well as to the pulmonary tuberculosis.

Pulmonary Tuberculosis and Pregnancy.

DR. A. J. HOOD STOBO showed two patients who demonstrated the influence of artificial pneumothorax in the treatment of pulmonary tuberculosis in pregnancy.

The first patient was thirty-one years old. She first attended the hospital on November 28, 1928, with a history of having had pulmonary tuberculosis for the previous four years. An hæmoptysis occurred fifteen years and again three months prior to admission. When first seen, the patient was five and a half months pregnant. X ray examination revealed evidence of old tuberculosis at both apices and of more recent tuberculosis of the right upper lobe in the subapical region and definite dilatation of bronchi in the right hilar region. Induction of artificial pneumothorax on the right side was undertaken and satisfactory collapse was obtained. The confinement occurred in March, 1929, without incident. The patient was a hard worker, and during the course of the artificial pneumothorax treatment had several hæmoptyses. In November, 1930, it was deemed advisable to avulse the phrenic nerve on the right side. Pneumothorax treatment was discontinued on April 15, 1931.

The second patient was twenty years of age and first attended the hospital on October 13, 1930, complaining of having had an hæmoptysis twelve months and again one

month previously. X ray examination revealed extensive mottling of the upper half of the left lung. Artificial pneumothorax treatment was commenced on October 17, 1930, and continued up to the time of the meeting. The patient was confined on April 23, 1931, after having a pneumothorax refill on the previous day.

Hæmorrhagic Disease with Cerebral Hæmorrhage.

DR. E. L. NEWMAN showed a baby that was born on March 23, 1931, after internal version on account of a transverse presentation. The child was in a condition of *asphyxia livida*, but was easily resuscitated. Four days after birth the child suddenly collapsed and became pale, with a rapid pulse. A small amount of bleeding occurred from the umbilical site. The child was desperately ill. Lumbar puncture yielded clear fluid. A blood count revealed a profound anæmia and eight cubic centimetres of maternal blood were injected into the sagittal sinus through the anterior fontanelle. Transfusion was stopped on account of cyanosis. The next day clonic spasms of the right side of the face and arm appeared. The fontanelle was bulging. A needle was inserted into the left lateral ventricle and almost pure blood was obtained. No blood was obtained from the right side. Subsequently ventricular puncture was done and two cubic centimetres of blood were removed from the fontanelle. Convulsive seizures appeared for a period of twenty-four hours, and then the child began to convalesce. It was discharged apparently normal.

Gall Stones.

DR. ERASMUS BLIGH showed two patients who were suffering from gall stones. He drew attention particularly to the differences in their ages. The first patient was a man, aged seventy-two years. At operation two large stones were found impacted in the common bile duct and two stones causing definite obstruction at Vater's papilla.

The second patient was a young woman, aged twenty years, who had suffered from pains in the right hypochondrium for a period of thirteen months. At operation three stones were removed from the gall bladder.

Osteomyelitis.

Dr. Bligh also showed a child, aged two and a half years, who was admitted to hospital on January 16, 1931, with a history of having been ill for three days. The temperature was 40° C. (104° F.), the pulse rate was 140 and the respiratory rate 60 in the minute. No definite abnormality was detected. Two days later tenderness appeared over the upper third of the right tibia. Operation revealed acute osteomyelitis which spread rapidly down the shafts of the bone. On March 19, 1931, the whole of the tibia was exposed. Dr. Bligh pointed out that the epiphyses had taken up a new position and according to the radiologist's report had moved from the old shaft in a backward direction and lay over the upper end of the involucrum.

Xanthoma of the Finger.

DR. V. M. COPPLESON showed a woman, aged fifty-six years, who on admission complained of swelling and stiffness of the first interphalangeal joint of the left index finger of fifteen years' duration. During three months prior to admission the swelling increased rapidly. The swelling was large, fusiform and nodular, and extended from the base of the first phalanx of the index finger of the left hand to the middle of the middle phalanx, completely obliterating the outline of the interphalangeal joint. The overlying skin was not red and neither pain nor tenderness was present. There was no loss of function of the finger nor limitation of movement at the joint. The swelling was nodular, with soft, fluctuant lumps. An incision was made over the swelling, and the growth was found to consist of a multitude of firm, round lumps, like degenerated cartilage in a myxomatous substance. The growth was removed by curettage and the wound sutured.

Sarcomatous Uterine Polypus.

DR. H. Z. THROSBY showed a woman, aged fifty-four years, who was admitted on April 10, 1931, complaining of vaginal bleeding of three days' duration. She had had similar attacks of bleeding for the previous six years. On vaginal examination Dr. Throsby discovered a cervical polypus the size of a golf ball with a slender stalk. The polypus was evulsed and the uterus curetted. On examination the tumour was found to be a myosarcoma of the uterus of small spindle-celled type. Abdominal section was performed with the intention of removing the uterus, as the growth seemed to be localized. On opening the peritoneum, however, Dr. Throsby found numerous metastases on the pelvic colon and parietal peritoneum.

Gastric Ulcer.

DR. H. HUNTER JAMIESON showed a woman who had come to the hospital on January 5, 1929, complaining of constant severe pain in the left hypochondrium of approximately fourteen days' duration. The pain was not related particularly to meals. The patient complained of having lost weight and of heartburn. She did not complain of vomiting. Dr. Jamieson had treated her by means of an alkaline powder before meals and the last thing at night, and an alkaline mixture with a little bromide of potash after each meal, and by suitable diet. He pointed out that the patient had gradually improved, and had put on 12·6 kilograms (two stone) in weight. The progress was illustrated by a series of skiagrams. In February, 1929, a large chronic ulcer appeared fairly high up on the lesser curvature of the stomach. In September, 1929, the ulcer crater appeared to have diminished in size. In May, 1931, there was no six-hour gastric residue and no organic lesion could be detected in either stomach or duodenum.

Fracture of the Patella.

Dr. Jamieson also showed two patients who suffered from fracture of the patella. The first patient, a male, had fallen while playing cricket on March 30, 1931, and had fractured the patella by indirect violence. X ray examination revealed 3·75 centimetres (one and a half inches) of separation. The patella was wired at operation on April 2, 1931, and good apposition was obtained.

The second patient, a girl, fractured her patella by direct violence. The patient was injured on March 1, 1931, while riding pillion on a motor bicycle—she was thrown off and struck her knee against a telegraph post. X ray examination revealed a comminuted fracture of the upper third of the patella with some spreading of the fragments. The injury was treated over a period of eight weeks by splinting, with early passive and later active movements, together with massage. The result was satisfactory and movement was almost normal.

Congenital Purpura.

DR. W. WILSON INGRAM showed a woman, aged thirty-eight years, who was suffering from congenital purpura. The patient belonged to a family in which all the females were affected and in which the males were normal. The patient was first admitted to hospital nine years ago for uterine hæmorrhage. Prior to admission she had undergone curettage of the uterus on four occasions. Subtotal hysterectomy was performed, the cervix being left, owing to profuse hæmorrhage. Severe secondary hæmorrhage occurred ten days after operation. Following this the patient had numerous hæmorrhages into the legs at intervals of a few months. Blood counts made at this time showed that the erythrocytes numbered over 4,500,000 per cubic millimetre and the number went as high as 8,000,000. The spleen was exposed to irradiation by X rays on two occasions without relief. In 1927 the patient was treated for hæmorrhage by blood transfusion and relief followed for some months, the blood count revealing 4,000,000 erythrocytes per cubic millimetre. At the time of the meeting the patient had a hæmorrhage into the right leg, extending from the ankle to the knee. The leg was very tender, painful and swollen. Dr. Ingram pointed out that the patient's mother died at thirty-five years of age from cerebral hæmorrhage; her sister died at twenty-five from hæmorrhage after child-birth; a sister, twenty-two years of age, suffered from frequent hæmorrhages with cuts *et cetera*, and almost died at child-birth from hæmorrhage. The patient's daughter, aged seventeen years, was a bleeder.

Osteoarthritis of the Knee.

DR. S. H. SCOUGALL and DR. A. L. DUCKER showed a woman, aged forty-seven years, who came to hospital on October 1, 1930, complaining of a severe pain in her left knee of four days' duration. The pain was sudden in onset and was aggravated by movement. There was no history of trauma. Both knees had "clicked" at times, but had not become locked and had not let the patient down. Occasionally the right knee had been slightly painful. The patient had had two children and three miscarriages. Some years before coming to hospital she had an abdominal section performed, and two years earlier suffered from *angina pectoris*. There was no history of cough or of loss of weight, and no sore throat or evidence of sinus trouble.

On examination there was considerable tenderness over the anterior aspect of the left knee, in the region of the *ligamentum patellæ*, with some swelling. Extensive osteoarthritis was present in both knees. The painful and hypertrophied infrapatellar pad of fat in the left knee was removed and the patient had an uneventful convalescence. The condition gradually improved until January 10, 1931, when it was necessary to manipulate the knee forcibly under general anæsthesia. This resulted in considerable improvement, with absence of the severe preoperative pain. In view of her arthritic condition the patient was given a low carbohydrate diet and "Radiostoleum" three times a day. At the time of the meeting the patient was having no local treatment; the knees were painless and had a full range of movement.

Dr. Scougall said that this patient afforded an example of a type of osteoarthritis almost entirely associated with an hypertrophied fat pad, the removal of which relieved the pain.

Dr. Scougall and Dr. Ducker also showed a woman, aged forty-three years, who was suffering from osteoarthritis of the knee with superimposed tuberculosis. The patient came to hospital in January, 1930, complaining of a painful and stiff right knee of six years' duration, which had become worse during the last six months. The pain came on about five months after the birth of the patient's last baby; the birth was instrumental. The patient's past history was satisfactory, with the exception of an attack of pleurisy seven years previously. Her tonsils were removed four and a half months before admission to hospital, but no improvement in the knee resulted. X ray examination at another hospital five years before admission revealed early osteoarthritis.

On examination at the time of admission, the right knee was swollen, but the swelling was not of a doughy nature. The movements were limited and painful. Crepitus was present. There was no wasting of the quadriceps muscle. No localized point of tenderness was present and no abnormal masses were felt. In the left knee the only abnormality was some crepitus on movement. General treatment was undertaken and as no improvement resulted, the patient was advised to have an exploratory operation. This she refused. Nine months later the patient returned and stated that the knee was less painful. Clinically the condition had advanced, very little movement being present. The knee was tending to assume a flexed position. She had been using crutches for the past nine months. Operation was again advised.

On February 16, 1931, the right knee joint was explored. Advanced osteoarthritis of the femur, tibia and patella was found. A considerable quantity of necrotic, caseous-looking material was found beneath the patella, between the quadriceps tendon and the femur. Areas of this material were found in other parts of the body. Immediate examination was undertaken and no organisms or signs of tuberculosis were seen. Arthrodesis of the knee joint and synovectomy were then performed and plaster was applied from the waist to the toes, the opposite thigh being included as well; the affected knee was put into a position just short of full extension. Convalescence was uneventful. The material removed at operation was found to be "sterile on culture." Stained specimens were reported as consisting of "tuberculous granulation tissue with much caseation." Ten weeks after operation the X ray appearances suggested a moderate amount of bony union and probably complete arrest of the tuberculous process. The ankylosis was moderately good.

In commenting on the case Dr. Scougall said that the patient had symptoms and signs of osteoarthritis in both knees, the right being more affected than the left. The secondary supervention of tuberculous disease was a very rare sequence of events. Timbrell Fisher quoted one instance in the Guy's Hospital Pathological Museum. Jones and Lovett, Osgood, Pemberton and other authorities did not mention the complication. On the other hand, secondary osteoarthritic changes might be observed quite frequently in the more chronic forms of tuberculous joints. Bilateral knee joint tuberculosis was very rare, so that it was probable that the disease would not develop in the other knee, which showed signs of osteoarthritis. The atypical nature of the signs of tuberculosis in this case was of interest. The swelling of the joint, though apparent, was not of that semi-elastic, doughy nature typical of tuberculous joint disease. There was also absence of muscular atrophy, which was usually a marked and early symptom. Joint tuberculosis was commonly a disease of childhood. Whitman stated that among something over 5,000 patients with tuberculous joint disease treated at the Hospital for Ruptured and Crippled, seven-eighths were under fourteen years of age. The patient shown was forty-three years old.

The question of operation or non-operation in tuberculous joints varied with the age of the patient. In children a very conservative attitude should be adopted and radical operation rarely resorted to. The disease was milder and more tractable in children, and a type of treatment consisting of prolonged mechanical measures was possible with them, while it was not feasible in the adult. Furthermore, in children growing epiphyses were in contact with all joints, and the injury of some of them, as in the knee and shoulder, might result in extreme deformity. In adults, however, the question was entirely different and early operation was advocated on account of the destructive tendency of the disease and also because pain was often a serious factor. An adult with tuberculosis of the knee joint, for example, in the ordinary course of events could be cured in from four to five months by arthrodesis, whereas with conservative methods of fixation it would be a matter of three to four years, and at the best would result in a stiff knee.

Traumatic Exophthalmos.

DR. E. C. TEMPLE SMITH showed a boy, aged nine years, who was suffering from traumatic exophthalmos. Four years ago the boy was stabbed with a stick in the outer canthus of the right eye. The accident was followed by proptosis. Dr. Temple Smith pointed out that the eye was pushed directly outwards and not downwards, as it appeared, and he said that this generally pointed to a lesion at the apex or in the cone of the muscles. There was no murmur or thrill to suggest arterio-venous aneurysm. Vision and the fundi were normal. X ray examination revealed no abnormality in nasal sinuses or orbit. A week before the meeting the upper lid became slightly red and tender, suggesting possibly a periostitis. Dr. Temple Smith said that the points to be considered were a benign growth behind the eye, an unabsorbed hæmatoma and a mild degree of orbital periostitis.

Thyreoid Tumour of the Tongue.

DR. E. P. BLASHKI showed a child, aged seven years, who had been seen in the first instance on account of bronchiectasis and hæmoptysis. A rounded tumour was discovered at the base of the tongue. The tumour was cystic; it was 1·5 centimetres in diameter, it was situated in the mid-line and projected into the space anterior to the epiglottis for a distance of about one centimetre. At operation under "Avertin"-chloroform anæsthesia sharp bleeding occurred when the tumour was torn by grasping forceps. The nose piece of a tonsil snare was covered with rubber tubing and the snare was engaged around the base of the tumour, which was sessile. A diathermy current was applied to the snare, the other pole being applied to the child's back. After a few moments the snare was slowly closed and the tumour was removed

without further hæmorrhage. Pathological examination revealed thyreoid tissue beneath an epithelial surface; many varying sized gland spaces were filled with colloid material and some of the spaces were quite large and had papillary ingrowths.

Dr. Blashki also showed another girl who had a tumour similar to that removed from the previous patient. The mass was causing no symptoms and was observed during a general examination. The thyreoid gland was not palpable in the neck, and Dr. Blashki had decided not to interfere.

Compound Fracture of the Femur.

DR. E. M. HUMPHERY showed a patient, aged twenty-six years, a motor mechanic, who had been admitted to hospital on May 12, 1931, after a motor accident in a state of profound shock. On examination at the time of admission the right leg, including the knee joint, was found attached to the thigh by skin and quadriceps muscles only. The nerves and ends of the bone were exposed. The thigh was amputated under gas and oxygen anæsthesia. The flaps were lightly drawn together by four silkworm gut sutures. At the end of the operation the patient was practically pulseless and was hurried back to the ward. Subsequently the wound became very foul and the tissues crepitant. Fifty cubic centimetres of antigas gangrene serum were given. At this time the patient was regarded as moribund. He began to improve, however, and finally recovered. A huge slough separated from the back of the thigh. Dr. Humphery said that he regarded the case as an example of infection with aerogenic organisms, whose progress was stopped soon after the administration of the anti-gas gangrene serum.

Ulceration of the Hand.

DR. GEORGE R. HAMILTON showed a man, aged sixty-seven years, who cut his right hand with a piece of glass three and a half years ago. The wound did not heal satisfactorily and warts made their appearance. On examination there was a bluish discoloration of the skin, with much scarring on the dorsum of the hand and extending up and round the ulnar border of the forearm. The hand was covered with keratotic patches and crusts due to bleeding, together with scattered patches of ulcerated epidermis exposing granulation tissue. There was no discharge, and the hand was not tender. A pure culture of *Staphylococcus aureus* was obtained on culture.

Obituary.

ARTHUR WILLIAM MARWOOD.

DR. ARTHUR WILLIAM MARWOOD, whose death was recorded in a recent issue of this journal, was the son of the late Matthew Marwood, one of the early settlers in Victoria. He was born at Brighton, Victoria, in 1864. He went to school at Hawthorn Grammar School and Wesley College. From Wesley College he went to Dublin where he began the study of medicine. He also studied in Edinburgh and in 1887 took the diplomas of Licentiate of the Royal College of Surgeons and the Royal College of Physicians of Edinburgh and of the Faculty of Physicians and Surgeons of Glasgow. After graduation he became house surgeon at Saint Vincent's Hospital, Dublin, and did some work at Coomb's Lying-in Hospital. After his return to Australia Marwood became resident surgeon at the Geelong Hospital. He filled this position for two years and relinquished it in order to take up private practice in Geelong. He became associated with the Geelong Hospital in an honorary capacity and served the institution until his retirement from active practice on account of ill health in 1928.

During the war Marwood served with distinction. He enlisted in 1916 and left Australia with the Fourteenth Australian General Hospital and did useful work on the surgical side. In 1918 he was invalided home, but resumed duty later on as surgeon on the Hospital Ship *Karoola*. His work was always systematically and quietly carried out. The wounded men trusted his judgement and had affection for him. He was always courteous and considerate to other officers with whom he was associated. His friend, Dr. Elvins, has written of his personal qualities and has shown that he was held in high esteem by his fellow practitioners in private practice. He will be held in grateful remembrance by many.

Dr. H. F. H. Elvins writes:

Dr. Marwood carried on an extensive practice in Geelong for nearly forty years, devoting himself chiefly to surgery and midwifery.

His personal charm of manner, his clinical acumen, sound judgement and ripe experience combined with his unswerving adherence to the highest ideals of professional ethics gained for him the respect and confidence of his patients and professional colleagues.

He was always eager to help the younger members of his profession, especially the resident medical officers in the Geelong Hospital, many of whom have acknowledged the assistance and encouragement he gave them in gaining experience in their work.

As a young man he took a keen interest in all forms of amateur sport. He was a good all-round cricketer and played with the Geelong Cricket Club and also with the famous "Nondescripts" in the 'nineties. Later he played bowls with the same skill and enthusiasm he had shown on the cricket field, being for many years one of the most successful skippers of the Corio Club Bowling Section. As an amateur billiardist he wielded a useful cue and for several years he was billiards handicapper for the Corio Club.

His chief hobby was horticulture, and most of his scanty leisure was spent in his garden among his roses, concerning the cultivation of which he was an authority. He was an enthusiastic fisherman and his annual leave was invariably spent at some popular fishing resort. Abundantly blessed with a sense of humour, an excellent *raconteur* with an inexhaustible collection of stories, Arthur Marwood was always in demand at social functions. He was at his best when "yarns were swopped" in the smoke room at night after dinner at Scamander, Tasmania.

In 1916 he was on active service in Egypt with the Fourteenth Australian General Hospital as one of the surgical team holding the rank of major, and did very fine work. His devotion to duty in a trying climate took heavy toll on a constitution never too robust, and while in Egypt he contracted a severe illness, from the effects of which he never fully recovered. He took a great interest in the welfare of the soldiers and nursing sisters, by whom he was much beloved. He was always affectionately referred to by diggers, nursing sisters and his brother officers as "Dad Marwood."

On returning to private practice in Geelong after the war, he accepted the position of Medical Officer, under the Repatriation Commission, to the returned soldiers, until gradually failing health compelled him to retire from all active work.

He died on August 6 last, the sixty-seventh anniversary of his birthday. He has passed on, sincerely mourned by his colleagues and a large circle of patients and friends, leaving a fragrant memory of a man who always "played the game."

MAVIS STELLA ENGELBRECHT.

DR. MAVIS STELLA ENGELBRECHT, whose death was announced in our issue of July 18, 1931, was the daughter of the late Carl Richard Engelbrecht, of Mount Gambier, South Australia. She was born at Mount Gambier, went to school at the Loreto Convent, Portland and Ballarat, and studied medicine at the University of Melbourne. She graduated as Bachelor of Medicine and Bachelor of Surgery in 1925. From February, 1926, to October, 1927, she was engaged in private practice at Newstead, Victoria. Subsequently she became resident medical officer at the Adelaide Hospital. After leaving Adelaide she held resi-

dent appointments at the Upper Goulburn Hospital, Woods Point, Victoria, the Wagga Hospital and the Hamilton Base Hospital. Owing to failing health she was compelled to relinquish her work at the last-named institution. She was of a quiet and reserved disposition and gave much of her time to reading.

Dr. Jean Grant writes:

It was during her first year at Saint Mary's Hall that I became a friend of Mavis Engelbrecht, and I have the very pleasantest memories of work and play in her company during the subsequent years of her medical course.

She was a very industrious student, was well liked by the hospital staff and patients at Saint Vincent's, and became a staunch friend of all who gained her confidence. Her independence of character was almost extraordinary, and she was possessed of courage and perseverance seemingly altogether out of keeping with her small stature and not over robust physical health. Her finals were passed at a time when hospital appointments were hard to get, and not being fortunate enough to secure one, she purchased a car, obtained a licence to drive, set off for Newstead and put up her plate. Her next venture was Woods Point, an isolated practice, in wild, sparsely populated country, where the roads were dangerous enough by day and doubly so by night. The rest of the story is not a happy one. She knew that her condition was practically hopeless some twelve months before the end, but kept it a close secret from both relatives and friends, and it is in keeping with what they knew of her character that she should fill in with constant hospital resident work what must have been to her two lonely and miserable years.

WILLIAM EDWARD WARREN.

WE regret to announce the death of Dr. William Edward Warren, which occurred on August 27, 1931, at Moree, New South Wales.

JAMES KYNASTON COUCH.

WE regret to announce the death of Dr. James Kynaston Couch, which occurred on August 31, 1931, at Perth, Western Australia.

ROBERT GORDON CRAIG.

WE regret to announce the death of Dr. Robert Gordon Craig, which occurred on September 2, 1931, at Binnaway, New South Wales.

Correspondence.

ORTHOPÆDIC SURGEONS.

SIR: I wish to protest against Dr. Corlette's remarks *re* orthopædic surgeons as reported in your issue of August 15 (page 214). They appear to me to be lacking in good taste and accuracy and, further, to reveal a lamentable want of knowledge of orthopædic principles.

Yours, etc.,

JOHN HOETS.

143, Macquarie Street,
Sydney,
August 17, 1931.

TRACHOMA.

SIR: I have just received an interesting letter from Dr. Wilson, of the Giza Memorial Ophthalmic Laboratory, Egypt.

In the course of the letter he states that he agrees that the danger of infection by trachoma is very slight in an Anglo-Saxon community. In five years in Egypt he has only seen two cases of the disease in English subjects, and in the British Army in Egypt in the last four years there has apparently not been a single case amongst the troops. All the same, the ætiology is very puzzling and, as I have indicated in previous letters, in leprosy, in trachoma, and in gonorrhœal ophthalmia there is a factor with which we are not yet acquainted.

It must be remembered, too, that in Egypt it is estimated that 80% of the population have had trachoma and in some section of the population every one is, or has been, infected.

Yours, etc.,

JAMES W. BARRETT.

103-105, Collins Street,
Melbourne,
August 19, 1931.

TUBERCULOSIS IN AUSTRALIA.

SIR: Dr. Cumpston's very able and interesting article on "Tuberculosis in Australia," which appears in your issue of August 8, contains one statement with which I must express a difference of opinion. Referring to the declining incidence of tuberculosis of bovine origin in children, he says: "Although we may be impatient at the rate of progress, we know as yet of no shorter road than that we are travelling."

I maintain the following propositions: (i) There is a shorter road. (ii) We in Queensland have followed this road unwittingly (and therefore can claim no credit for having done so). (iii) As a consequence non-pulmonary tuberculosis, that is, the tuberculosis of infancy and childhood (for such cases in adults hardly affect our statistics), is much less common than in the other Australian States, although pulmonary tuberculosis is not much less common. Furthermore, tubercular troubles in our children, for instance tubercular meningitis, which is comparatively rare here, can usually be traced to a human source of infection. There is a strong probability that bovine infections are extremely rare, though unfortunately no attempts have been made to confirm this by culture of the bacilli.

I arrived in Queensland in 1889, and have been on the staff of the Hospital for Sick Children, Brisbane, from that date. Two things struck me forcibly. Firstly, the rarity of all tubercular disease in children as compared with England and the other Australian States. This did not appear in the mortality returns, as Dr. Cumpston has shown. It was a prevalent habit in the 'nineties for Brisbane medical men to certify many of the numerous cases of infants dying from chronic innutrition as "*tabes mesenterica*" or simply as "tabes." These were supposed to be cases of abdominal tuberculosis. My *post mortem* examinations soon convinced me that this was an error. The second thing that struck me was that owing to our long summers and short winters, nearly all Queensland mothers had formed the habit of boiling their milk all the year round to keep it sweet. These two facts I regard as effect and cause.

To prevent tuberculosis from bovine sources, no long continued, gradual and difficult methods are necessary. The cause of these diseases is the unclean habit of drinking raw milk, and especially of feeding raw milk to infants and young children. For the maintenance of this habit the medical profession have been mainly responsible.

Yours, etc.,

A. JEFFERIS TURNER, M.D., D.P.H.

Brisbane,
August, 19, 1931.

RADIOLOGISTS AND GENERAL PRACTITIONERS.

SIR: The following quotation from your leading article in the journal of August 15 provides the text for this letter: "As far as an X ray examination is concerned the man who proposes to treat an injury to bone or joint without

having an X ray examination made is certainly asking for trouble." A similar opinion is also expressed by the Council of the New South Wales Medical Union, which states in its last annual report: "The Council again wishes to impress upon members the importance of an X ray examination in all cases of possible fracture, dislocation *et cetera*. Neglect of this precaution is apt to be looked upon unfavourably in a court of law." These authoritative statements definitely remove the provision of X ray facilities from the ruck of ordinary minor medical equipment. To provide these facilities and to thus lift their work from the rut of routine medical effort, numerous practitioners in country centres have each expended hundreds of pounds on X ray equipment. Many have undertaken post-graduate education in X ray work. I have compiled a list of such practitioners, and find they are about seventy in number. It is obvious then that they provide the only X ray facilities available to thousands of the population of New South Wales in many cases of illness and accident. These patients include many workers coming under the scope of the *Workers' Compensation Act*. What, then, is the remuneration now offered them by numerous insurers concerned with this Act? The Government Insurance Office wrote me as follows: "We have recently decided not to pay in excess of £1 1s. for X ray examinations by general practitioners." (Previously the fee paid was always £2 2s.) A remonstrance brought forth the following reply from the Chief Medical Officer of that Company: "The Acting Secretary of the B.M.A. [presumably Dr. Hunter] and the Chief Medical Referee of the Workers' Compensation Commission were both consulted and agreed with the terms which we proposed to offer to the general practitioners. We have therefore not acted without considerable outside support."

Facts and figures could easily have been presented by general practitioners owning X ray plants which would have conclusively shown that such a decision was unjust. At no time was the opinion of these practitioners sought as to what they might consider fair remuneration for their services. The film may be of good quality and the opinion backed up perhaps by years of clinical knowledge quite worthy of the occasion. Nevertheless, he is a general practitioner, and the fee therefore must be no more than £1 1s.! Certainly a great and inspiring incentive for any practitioner to indulge in the expense of providing X ray equipment in an endeavour to avoid the weighty consequences of his neglect as outlined at the beginning of this letter. In Schedule D we find under Section (ii) "Eye Operations": "Removal of foreign body from cornea—one or more—£1 1s." Armed with an eye spud costing a few shillings, the practitioner who in a few moments flicks a foreign body from the cornea is considered worthy of the same fee as the man who provides elaborate and expensive X ray facilities! The prophylactic value of the corneal operation is undoubted, but does not approach either in effort or value the X ray procedure.

Dr. R. M. Mackay, in his article appearing in the journal of August 15, page 194, writes: "The sanction of the employer (or his insurer) to take a radiograph of the patient and a statement of the cost made at the same time would obviate subsequent dispute as to payment therefor." Within the area of the North-Eastern Medical Association we have adopted that method for months past. By resolution passed, members of the North-Eastern Medical Association agree to accept from insurers no fee less than £2 2s. for X ray services. The company concerned is advised to this effect either through its local office or by wire to Sydney. Every facility is thus presented to the company to secure X ray services at the fee of £1 1s. should it so desire. There is no reason why a similar procedure should not be adopted by every local association throughout New South Wales. It is high time that some combined action be taken by the X ray general practitioners in New South Wales to guard their common interests and to attempt to adjust the anomalous fee at present offered by some insurers in workers' compensation cases.

Yours, etc.,

A. J. OPIE.

Lismore.
August 20, 1931.

LIFE.

SIR: The very interesting and very eloquent Bancroft Memorial Lecture delivered by my colleague, Professor Wood Jones, prompts me to enter a protest against an assumption so frequently made by physicists that the only life possible is that familiar to us on this planet. Naturally earth life is delicately and exclusively adjusted to earth chemistry and earth physics, but for us who have never travelled outside our "inconsiderable portion of an inconsiderable system" to declare dogmatically that we possess the one and only form of life is surely gratuitous and parochial. I can imagine life in the sun, where silicon takes the place of carbon and where the flow of material units necessary for life occurs at a temperature befitting the components of such living tissue. What right have we to deny that life may exist in the centre of a star amid conditions about which higher mathematicians write with such enthusiastic disagreement?

Professor Wood Jones quotes with approval Francis Thompson's lines:

> That thou canst not stir a flower
> Without troubling of a star.

This idea is as old as Sir Isaac Newton and was expressed in very clear language by Edgar Poe in 1848:

> If I venture to displace, by even the billionth part of an inch, the microscopical speck of dust which lies now upon the point of my finger, what is the character of that act upon which I have adventured? I have done a deed which shakes the Moon in her path, which causes the sun to be no longer the sun, and which alters forever the destiny of the multitudinous myriads of stars that roll and glow in the majestic presence of their Creator.

Yours, etc.,

W. A. OSBORNE.

The University,
Melbourne.
September 1, 1931.

INTESTINAL OBSTRUCTION.

SIR: Dr. C. Craig, in your issue of the fifth instant, mentioned the possible advantages of radiography in the diagnosis of intestinal obstruction. Some years ago, at the Hospital for Sick Children, Brisbane, I undertook to X ray any cases diagnosed as intussusception. This was done without any opaque meal being given, and the dilated segment of bowel proximal to the block was always quite easily seen. The radiographic examination not only clinched the diagnosis, but localized the lesion. These cases were examined more from an academic than practical interest, and having proved the feasibility of this form of diagnosis, the method was dropped. However, it appears that there is no reason why subacute intestinal obstruction should not be very easily diagnosed radiographically without running the risk of giving the patient a barium meal. Compare also the easy visibility of the dilated bowel in Hirschsprung's disease. The late Dr. Ironside Bruce, of Charing Cross Hospital, in 1917 was the first radiologist I can remember mentioning the possibilities of this method of diagnosis.

Yours, etc.,

A. T. NISBET.

139, Macquarie Street, Sydney.
September 5, 1931.

A BIOLOGICAL EXPEDITION TO THE GREAT BARRIER REEF.

AN expedition of particular interest to naturalists will start in December next and spend four weeks visiting selected coral fringed islands and atolls in the Barrier Reef area off the Queensland coast.

The excursion will start from Mackay, camp on the Cumberland Islands, Percy Islands, Capricorn Islands and

Bunker Islands in turn, and finish at Bundaberg. Several of the atolls to be visited have only rarely been landed on, especially the east Cumberland Islands, which are quite close to the Barrier Reef proper.

Sea birds breed in millions on all the islands to be explored, while turtles come ashore in thousands to deposit their eggs in the sandy beaches. The fishing in these waters is quite exceptional, and huge sharks and rays are very plentiful.

The arrangements are in the hands of Mr. E. F. Pollock, F.R.G.S., of the Royal Zoological Society of New South Wales and the Royal Australasian Ornithologists' Union. Full particulars can be obtained by any medical practitioner desirous of joining, by writing to Mr. Pollock at 7, Carrington Avenue, Strathfield, New South Wales.

Books Received.

PRACTICAL METHODS IN THE DIAGNOSIS AND TREATMENT OF VENEREAL DISEASES FOR MEDICAL PRACTITIONERS AND STUDENTS, by D. Lees, M.A., M.B., D.P.H., F.R.C.S., M.R.C.P.(E.), with Introduction by W. Robertson, M.D., F.R.C.P., D.P.H.; Second Edition, 1931. Edinburgh: E. and S. Livingstone; Sydney: Angus and Robertson. Crown 8vo., pp. 654, with illustrations.

Diary for the Month.

SEPT. 15.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
SEPT. 22.—New South Wales Branch, B.M.A.: Medical Politics Committee.
SEPT. 23.—Victorian Branch, B.M.A.: Council.
SEPT. 24.—South Australian Branch, B.M.A.: Branch.
SEPT. 24.—New South Wales Branch, B.M.A.: Branch.
SEPT. 25.—Queensland Branch, B.M.A.: Council.
OCT. 1.—South Australian Branch, B.M.A.: Council.
OCT. 2.—Queensland Branch, B.M.A.: Branch.
OCT. 6.—New South Wales Branch, B.M.A.: Organization and Science Committee.

Medical Appointments.

Dr. W. L. Reid has been appointed Resident Medical Officer at the Adelaide Hospital, South Australia.

* * *

Dr. W. Christie (B.M.A.) has been appointed Principal Medical Officer, Division 2, in the Education Department, under the provisions of the Public Service Acts, 1916 to 1925, South Australia.

* * *

Dr. L. D. Hodby (B.M.A.) has been appointed Medical Officer of Health by the Wickepin Road Board, Western Australia.

* * *

Dr. H. Stubbe (B.M.A.) has been appointed Acting Medical Officer of Health by the Peppermint Grove Road Board, Western Australia.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xvi.

AUSTRALASIAN MASSAGE ASSOCIATION, SYDNEY, NEW SOUTH WALES: Lecturer in Medical Electricity, Lecturers (2) in Clinical Massage.

LAUNCESTON PUBLIC HOSPITAL, TASMANIA: Resident Medical Officer (male).

PERTH HOSPITAL, PERTH, WESTERN AUSTRALIA: Junior Resident Medical Officers.

THE WOMEN'S HOSPITAL, SYDNEY, NEW SOUTH WALES: Junior Resident Medical Officer.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company, Limited. Phœnix Mutual Provident Society.
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Members desiring to accept appointment in ANY COUNTRY HOSPITAL, are advised to submit a copy of their agreement to the Council before signing, in their own interests. Brisbane Associated Friendly Societies' Medical Institute. Mount Isa Mines. Toowoomba Associated Friendly Societies' Medical Institute.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge Appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 65, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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